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1920—Thirty Years of Service to Construction—1950

Contractors and Engineers Monthly

Vol. 47, No. 10

OCTOBER, 1950



• Irrigation, Navigation Canals

Some 8½ miles of the Wellton-Mohawk Canal, part of the Gila Project, are dug and lined with compacted earth. See page 5.
The Chain of Rocks navigation canal in the Mississippi is dredged. See page 89.

• Expressway Paving

Page 10 reports the first contract for concrete paving on the Atlanta Expressway. Crushed granite stabilizes the subgrade.

• Grading Enlarges Airport

As told on page 14, grading added 800 acres to Lambert Field in St. Louis. A ground map speeded cut and fill work.

• Jim Woodruff Dam

A two-part story on pages 20-21 covers cofferdam grouting in the lock and spillway, and concrete placing in the lock.

• County Road Work

County's prisoners work roads without endangering contract system. Page 24.
Part of a county resurfacing job was on a road "floating" over a swamp. Page 70.

• Hospital, Garages

Cast-in-place piles found a 7-story concrete hospital in Mobile. See page 33.
Two garages, ramp and elevator type, ease a city's parking jam. See page 73.

• Hot-Mix and Road-Mix

Twin hot-mix plants make paving news on a Texas relocation contract. Page 37.
A sand-bituminous road-mix goes down on a Florida secondary road. Page 100.

• Marine Amphitheater

Wellpoints held back bay water as the substructure was built on a sand fill. The pictures and article are on page 44.

• Floodway Embankment

Rain and wet soil have slowed dirt-moving for the Morganza Floodway control structure. Turn to page 49.

• Highway Maintenance

Vertical drains filled with salted gravel are Iowa's answer to frost boils. A special drill bores the holes. Page 54.

• Harbor Dredged

Page 59 tells how a veteran clamshell rig dug 2,100,000 cubic yards to deepen the Portland, Maine, harbor by 5 feet.

• Delaware Memorial Bridge

It includes a 2,150-foot suspension span, sixth largest in the world. Page 62 pictures and describes steel erection.

• Roadside Development Course

Louisiana's first short course in roadside development is reported on page 67.

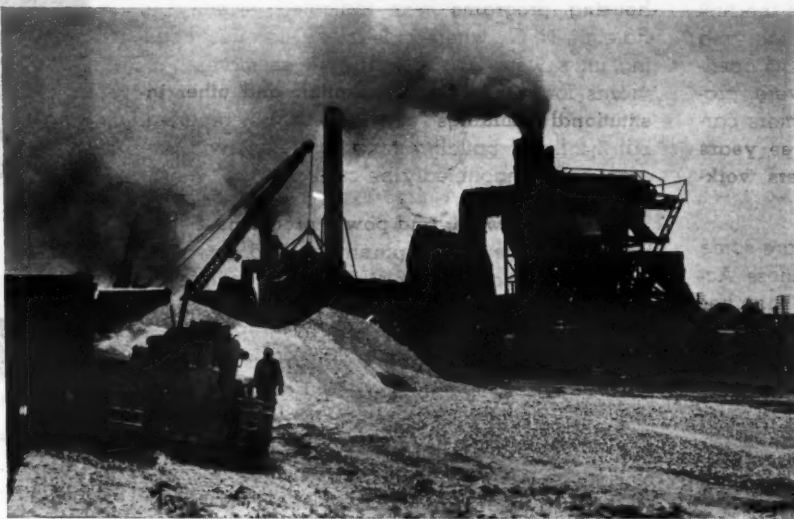
• Mountain Road Grading

The Great Smokies had visitors this year: dirt-movers and rock drillers on a 5-mile grading and bridge job. Page 81.

• New Type of Road

A patented method of building roads which support 10-ton loads after 6 hours is described in a picture story, page 92.

(You will find "In This Issue" on page 4)



TWIN HOT-MIX PLANTS working together on the same project are a rarity. But Public Construction Co. used the two shown at left (the second is about 500 feet in back of the first) to boost hot-mix production to 2,000 tons daily for its 5-mile \$425,000 road-relocation contract on U. S. 67 east of Dallas. The story is on page 37.

Both plants have Madsen pugmill mixers, Simplicity dryers and dust-collection blowers, Cedarapids dryers and screens, and Caterpillar engines. Feeder bins are specially designed. Some 25 dump trucks were needed to handle the material when both plants were working, and two Adnun Black Top Pavers doubled up to lay it.

The relocation will take about 40 minutes off the time now needed to enter Dallas from the east and cross town toward Fort Worth.

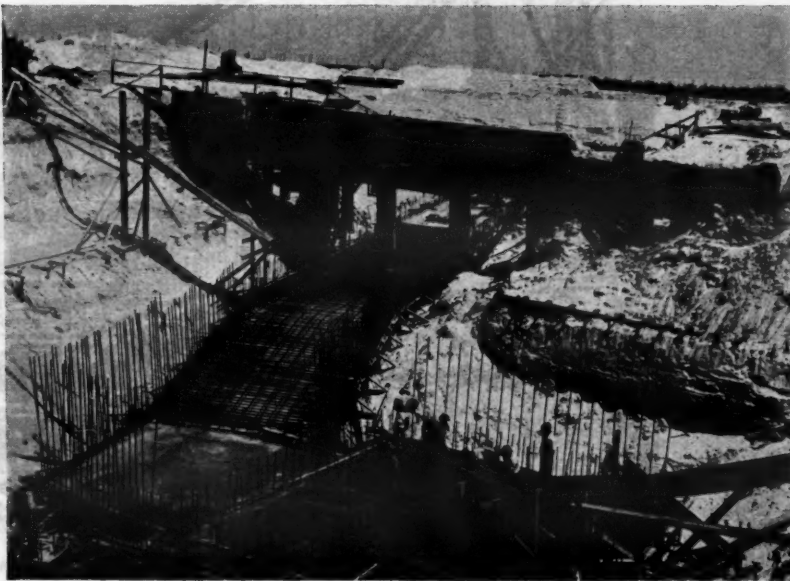
C. & E. M. Photos

JIM WOODRUFF DAM is under way on the Apalachicola River in northwestern Florida, at the Georgia line. The major contract includes a lock and fixed-crest spillway, both of concrete. The view at right taken in the lock hole shows a Page dragline swinging a Blaw-Knox concrete bucket off a trailer.

The first of the companion articles on pages 20-21 tells how a grout curtain was put down around the two construction areas to seal off water seepage. Special admixtures made it possible to pump at low pressure, for distances of 300 feet, a grout containing as much as 6 parts of sand to one part of portland cement. Wellpoints lowered the water table in the overburden.

The second article covers concrete placement—especially the conveyor system for moving aggregates to the Johnson batching and mixing plant, and the refrigeration system at the plant. (Corps of Engineers spec stipulate that concrete warmer than 65 degrees may not be placed in the dam.)

Perini, Walsh, Mills, and Blythe Brothers Construction Cos., of Framingham, Mass., hold this \$8,714,972 contract.



A MARINE STADIUM is going up at Jones Beach State Park on the south shore of Long Island, N. Y. Lenart Constructors, Inc., of New York City, is building the substructure. (See page 44.) What you're looking at, left, is the foundation hole for the elevator shaft and stairwell at the inshore end of the stage-to-stadium tunnel. Forms for the 100-foot-long tunnel lead off at back.

Before construction could start, the contractor engaged a dredge to pump fill from the bottom of Zachs Bay, adjacent to the site, to form a work platform. Then he drove 1,300 cast-in-place 14-inch RC piles into the sand.

A Foundation Equipment wellpoint system was installed around the open cut to hold back water from the bay, only 40 feet away. A first header line went in at elevation 0 and a second at elevation minus 12 to dry out the hole down to elevation minus 24. Concrete was delivered to the job by truck mixers.

NEWS AND VIEWS

of the construction industry at home and abroad—trends, State and Federal legislation, materials, and costs

Perspective is everything these days, so we cite without comment a little tale told by the "New York Times" about a paved white motor road which now streaks across the Yugoslav midlands between Belgrade and Zagreb, replacing a rutted dusty track that could be negotiated painfully in ten hours. The new road is the first major achievement of Tito's five-year plan, and though Tito himself was not present at its opening this past summer, his praises were proclaimed in speeches, songs, and streamers carried by the labor brigades. **It took three years to build that road and 300,000 volunteers working with pick and shovel.**

For another kind of perspective, here are some figures cited in a recent issue of "Business Action", a weekly report from the U. S. Chamber of Commerce, **comparing our status when we entered World War II and when we embarked on police action in Korea.** In 1939 we had 370,000 men in the armed services and a nominal defense budget. At the time of the North Korean communist aggression, we had about 1.5 million men in the armed services and we had spent since 1945 some \$50 billion in defense. Then we had 47.7 million employed. Now we have 61.5. Then crucial raw materials were cut off. Now this is not yet a problem, and we have been stockpiling judiciously. In 1942 we were devoting almost 50 per cent of our total effort to war. Today, even with the expanded military program, only about 10 per cent of our resources will be so directed. Though prices have risen some 70 per cent over 1939, inventories of materials and goods are nearly 300 per cent of that year's figure. This is not the time, said the article in "Business Action", and **there is no necessity yet for drastic meat-axe price and wage controls.** For the time being we should rely primarily on indirect controls through well thought-out fiscal, monetary, and credit policies.

Another report, this time from the American Iron & Steel Institute, is equally sight-lifting. **Our steel companies can today provide 2,240 pounds of steel for every 2,000 pounds needed when World War II was at its height.** They can turn out each year 1,332 pounds for each person in the U. S. That compares with 992 pounds in the United Kingdom, 486 pounds in France, and an estimated 256 pounds in Russia. Full 24-hour output of ingots and castings can yield every day finished steel for the following items, average sizes: an aircraft carrier, 2 heavy cruisers, 2 cargo ships, 2 tankers, 500 planes, 1,000 antiaircraft guns, 500 tanks, 500,000 3-inch shells, 1,000 howitzers, 2,000 aerial bombs, 1,000 freight cars, 2,000 trucks, 12,000 autos, 2,000 homes, 2,000 household refrigerators, and 20,000 stoves.

Despite these reassuring figures, a recent AGC survey notes steel shortages, along with cement and lumber shortages. It suggests, however, that the **scarcities can be attributed mostly to strikes in producing industries, seasonal demands, shortages of railroad cars, and scare buying.** Lumber prices have risen sharply, but the National Association of Home Builders reports reassuringly that the Department of Defense will buy only 1.5 billion board feet of lumber during this fiscal year. That is only one week's production in the lumber industry and will not upset the lumber market permanently, NAHB says.

As for home building, **FHA field officers have**

been directed to judge applications for home building loans on the basis of "need"—luxury homes are out for the time being—and to approve loans only if the contractor plans to start building at once and expects to finish the job within a year. That **inflated costs will hit public housing programs** was indicated recently in Raleigh, N. C., where bids on 150 low-cost housing units were 20 per cent over estimates. Programs for more **school, hospital, and other institutional buildings** continue to be reported, but if inflated building costs continue, such programs will undoubtedly be cut back.

Concerning water and power programs, Secretary of the Interior Chapman has laid down the following cutback rules. Work will continue on municipal and industrial water-supply projects; on irrigation projects that promise to yield water by July 1, 1952; on power construction except where the output would be slight and incidental to other functions; on all small projects that can be completed this year or in the next working season. Authorized work for which funds are available and which is justified as contributing to economic development or food production will continue. So will general investigations and operation and maintenance programs.

The compromise F-A highway bill as it was finally passed by Congress provides \$500 million a year for fiscal 1952 and 1953—\$225 million for primary roads, \$150 million for secondary roads, and \$125 million for the urban system. Other authorizations for Federal roads total \$94 million a year. **The 50-50 matching formula is retained.** There is no special authorization for



A Caterpillar D8 and dozer bring Chile's Bio Bio Irrigation Canal to final grade. Echenique y Hurtado of Santiago is the contractor. The cut is 10 meters deep.

the Interstate Highway System, or for "local roads" as such—they are included in the secondary funds. But the bill carries one innovation: **F-A funds may be used to retire bonds** issued by states, counties, cities for toll-free facilities on the F-A primary and urban systems. The bill is another cutback, yes, when you consider that AASHO officials recommended \$810 million and ARBA officials \$1 billion a year. But looked at another way, and keeping a tight hold on that perspective we mentioned, it is a boost of \$50 million over the \$450 million F-A program of 1950 and 1951.



The Tacoma Narrows Bridge, now nearing completion, replaces the famed "Galloping Gertie" which went down in 1940. Douglas-plywood anchor forms are in place and toll-house forms in the foreground are partially erected.

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Flood-Control Story Of Rebellious River

The Rebellious River is, of course, the Mississippi, particularly its lower portion, through which drains 41 per cent of continental United States extending from western New York State to the eastern edge of Idaho. The book treats of floods, the river's great problem, and their control, about which so many divergent views have been expressed since the first levee was built in 1727 to protect New Orleans. From that year until the present, opinions as to how the Mississippi and its tributaries should be controlled have corresponded approximately to the number of river experts who set forth their own plan as the one that should be followed.

Since the author, J. P. Kemper, a civil engineer, is a well known authority on floods and flood control, a good part of the book's contents is given over to what he felt was the best plan for flood control in the Mississippi Valley. This did not always coincide with the program of the Corps of (Army) Engineers and the Mississippi River Commission, the Federal agencies which direct flood control on the lower river. Hence large sections of the volume, especially the last half relating to the "capture of the Atchafalaya by the Mississippi", are steeped in controversy.

A publishing time lag results in the omission of any direct reference to the great spillway now under construction on the Mississippi at Morganza, Louisiana. But the author discusses this project since it was first proposed in connection with the diversion of part of the Mississippi floodwaters through the Atchafalaya River, the short route to the Gulf of Mexico.

In bringing us up to the present time, the book develops a well detailed story of the river, its tributaries and basins, with hydraulic data given in terms easily understood by the nontechnical-minded reader. The history of flood control is thoroughly covered, including mistakes as well as achievements of the past. Best remembered is the faulty "levees only" policy, which was sharply revised in favor of the more comprehensive program that included levees, cutoffs, dredging, revetments, floodways, etc. to bring the river under the control of man.

An excellent chapter treats of the Atchafalaya River which is second only to the Mississippi in the United States in carrying capacity of volume discharge. Its 120-mile length through lower Louisiana is shorter to the Gulf by about 160 miles than the Mississippi. Consequently its proximity to the major stream has long been of concern to hydraulic engineers who fear the meandering Mississippi is disposed to leave its present course in the great alluvial valley and follow the Atchafalaya.

In his analysis of river behavior, the author is definitive in his writings. As for the controversy with the Federal regulating agencies, only time may possibly tell whose plan of flood control is best and most economical.

The book does appear to be on solid ground in its criticism of the rotation system of district engineers as practiced by the Corps of (Army) Engineers, which "does not permit an engineer to stay with the job long enough to understand it and then put it into effect. He must move on and make room for another inexperienced man to take his place". While the great bulk of the engineering talent in the Corps lies in its civil employees, the major decisions are made by top brass who may be lacking in necessary river experience.

The single shortcoming of "Rebellious River" is the paucity of maps. The reader will find two small maps, drawn with greatly reduced scales, of little help in trying to follow the text. Detailed drawings of the various river basins, and particularly one of the Morganza area showing the relative

positions of the Mississippi, Atchafalaya, and Old Rivers, would have been of much assistance.

Too bad that the interesting section on classic crevasses was written too late to include the story of the major crevasse that occurred last year at Mulatto Bend across from Baton Rouge. The tale of the rapid closure effected by the Corps of Engineers with a minimum of damage to property and no loss of life was river drama at its highest.

The book costs \$6.00 and may be se-

cured from the publisher, Bruce Humphries, Inc., 30 Winchester St., Boston, Mass.

Bulletin on Expressways

Studies for the relief of city traffic congestion, one of the nation's most irritating domestic problems, usually favor the controlled-access expressway. The impact of an expressway on an urban area may, however, create new and unforeseen problems. Recogn-

nizing this, the Department of Traffic and Operations of the Highway Research Board set up a committee to study the effects of expressway operation on adjacent urban areas. The committee's findings are published in Bulletin No. 25, "Controlled-Access Expressways in Urban Areas".

This bulletin may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. The price is 60 cents.

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Will History Repeat Itself?

The great lesson of history is that men do not profit by its lesson. Only a few weeks after our involvement in the Korean civil war, opinions were expressed in many quarters that public-works construction should be drastically curtailed in this country. Funds thus "saved" are supposedly to be given over for defense measures. Such funds are never really saved, for their diversion causes damage to the country's economy as a whole—damage that takes years and far vaster sums to repair.

Look back to the last war during which the highway construction program practically came to a halt. We have still a long way to go to make up for the dearth of road building in those war years. Needed new arteries of transportation have failed to catch up with the ever-increasing number of motor vehicles that have been manufactured during this short interval of peacetime activity. The shortcomings of our highway system were badly felt during World War II. Our roads are still in poor shape, and will only become worse if the highway construction program is permitted to lapse. Yet Congress is considering drastic cuts in Federal highway-aid appropriations to the more populous and industrialized states—states where roads are of greatest importance in a war economy.

The general stoppage of flood-control projects during the last war resulted in damage that has never been fully estimated. The same thing can happen again. It may happen anyway, through war-induced shortages of steel, cement,

lumber, etc.

Examples of this "cut public works" attitude are numerous. New York City, never slow to get excited, is already sidetracking indefinitely public-works projects, while earmarking \$1,883,000 at once for such civil defense items as sirens, radioactivity detection equipment, and medical supplies. Funds for the latter item alone are expected to be increased to \$19,000,000. City officials have also proposed the building of atom-bomb shelters to cost \$2,000,000, with Federal help of course.

The well known water-shortage plight of the country's largest city is a result of the last war. Projects then under way to increase the supply of water were shut down because of material and manpower shortages. Consequently New York City has been in serious danger of a water famine which will not be eased until 1952, when facilities now under construction will be put into service. It takes time to build dams, tunnels, and conduits as well as money.

When the President now calls for a sum like \$10,500,000,000 for military spending, over and above what has already been spent on "defense", it is not too much to ask that funds for needed civil works should not be sacrificed to the greedy maw of war. Priorities, if and when we get them, should not be arbitrarily given for things military at the expense of civil construction that may be just as vital to the overall welfare of the nation. For once, let us learn something from history.

No Time for Slowdowns

What good are faster machines if their operators slow them down?

At Lambert Airport at St. Louis, a contractor recently bought several International TD-24's. He was enormously pleased. Here, he thought, were fast new machines which, even though they had cost him several thousand dollars more than other current tractors, would spark his dirt-moving outfit to new life.

What happened?

Union operators out of the St. Louis area got on the TD-24's and refused to pass the slowest machine in the string.

There was absolutely nothing the contractor could do about it, either. He couldn't make an independent string out of the TD-24's, because that would have entailed a whole new set of dirt-processing equipment. Too, there was little reason to believe that the operators would work any faster simply because they had been segregated in the borrow pit.

This case is no isolated example. The same thing, with variations, is happen-

ing throughout the construction business. Bricklayers have slowed down notoriously. Other crafts have followed suit. That's what makes this situation serious.

For our money, it's one of the most vicious, un-American, unprincipled things to creep into the construction business. Un-American because we are, for practical purposes, on a semi-war footing, working under at least a moral rule to do our best.

Let's not yell "there's a war on", though. The whole sneaking business of work slowdowns goes much deeper than that. It means simply this: that the man who practices it is no longer willing to do an honest day's work for an honest day's pay. That's why we used "unprincipled" as one of our adjectives. Any trade of labor for money where one side or the other gets gyped violates the most fundamental principles of trade.

You can talk about man-hours and productivity and wage-hour laws and the other obfuscated terms which bear

on this simple relationship until the cows come home, but nobody can justify slowing down to the speed of the slowest man in the string.

If construction has come to that point, it's time to stop construction and save public money.

Labor itself could do the best job of reversing this dangerous trend. General rules are never very accurate, but in general, labor has 95 good honest craftsmen in its ranks for every 5 professional goons, slowdown artists, and agitators who dream up such sure-fire cost-raising schemes as putting oilers on the payroll to help air-compressor "operators".

It is up to every contractor, every newspaper and magazine, every public-spirited American to help labor get back to the solid concept of a decent day's work for its money.

An Architect Views The Single Contract

To the Editors,

CONTRACTORS AND ENGINEERS MONTHLY:

Your editorial "One Building—One Contract" in the August issue emphasizes an angle of the building construction industry which is of constant interest to architects. This is particularly true in the present era of high construction cost, when effort is concentrated on economy as never before.

I agree with your conclusion that conducting a building operation under several prime contractors will normally add cost to the owner and confusion to all concerned with the project. Modern building is such an intricate process in timing as well as structure that coordination of the efforts of all concerned is absolutely necessary, not only for the successful completion of the work, but for the protection of all concerned with it. If not furnished by a general contractor, it must be supplied by the consulting engineer, the architect, or the owner, none of whom is normally particularly well fitted to furnish it. Certainly it cannot be furnished by a specialty contractor.

Correction of the abuses that cause the demand for separate contracts is a much better approach. They are well known, and of long standing—"chiseling" in the award of subcontracts, and manipulating of payments so that the general contractor is actually being financed by his subcontractors' money. Architects of reputation constantly attempt to correct this situation, but a united effort of the whole industry is necessary if satisfactory results are to be obtained.

Yours very truly,
Alex. S. Corrigan
McKim, Mead & White
New York City

Road Men, Wise Up To Mother Nature!

To the Editors,

CONTRACTORS AND ENGINEERS MONTHLY:

In 1908, I supervised and drew up the specifications for the first concrete pavement built in Cook County, Ill., and later for reinforced-concrete pavements in various towns. I also designed 70 or more concrete bridges . . . Because of my work as a drainage engineer, I was elected President of the National Drainage Congress in 1926 . . .

In my opinion, based on 50 years in the engineering field, a highway engineer should be a good drainage engineer who understands . . . Mother Nature's hydraulic powers and the movement of soil moisture (none of which do we find in the textbooks). We may have a beautiful expanse of concrete pavement today, and in five years Mother Nature has gathered her hydraulic forces and blows up the best pavement the highway engineer can design—all because this so-called en-

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gineer does not understand the fundamentals of nature's forces.

The highway engineer should also be a good structural engineer who understands the strength of materials, and how and when to design an unbreakable slab, considering all the elements . . .

I think we are wasting money [on our highways] until all the highway engineers get together and answer the many questions which have been raised, to the end that a more perfect design can be devised to resist every element that tends to destroy all pavements.

We have forty-eight state highway departments, with forty-eight chief highway engineers, several hundred division engineers, and a thousand lesser lights. Among them they should be able to answer all these questions . . .

Until this is done, we will keep on building pavements and Mother Nature will continue to blow them up. Year after year millions will be spent in repair, until we are spending more money on maintenance and rebuilding than . . . on new work. Highway enthusiasts are asking for more Federal Aid for the construction of new roads—and I am in favor of such expenditure—but why not find the reason we have been squandering millions on poor pavements, and a way to build a lasting structure? . . . Are some of the ideas now in use an asset to a good pavement or a liability, and why? (Possibly they are an asset in one location and a liability in another) . . .

I am of the opinion that it would be worth a million dollars to have all the questions answered so that we can build a lasting pavement and eliminate the immense amount of repair now necessary . . .

Sincerely,
Edgar A. Rossiter
Consulting Engineer
Chicago

Recommendation Is Revised For Steel Reinforcing Bars

A revision of Simplified Practice Recommendation R26-49, Steel Reinforcing Bars, recommended by the American Iron and Steel Institute, became effective August 1. The revised recommendation, R26-50, consists of a bar number and the weight in pounds per foot for each of 10 sizes. The numbering system is based on the number of eighths of an inch in the nominal diameter of the bars. The weight per foot, to calculate the equivalent cross-sectional area of deformed bars, provides a uniform method for all styles of deformation.

Mimeographed copies of the revision may be obtained from the Commodity Standards Division, Office of Industry and Commerce, Washington 25, D. C.

Gila Canal Project Making Headway

Compacted Earthen Lining Will Diminish Seepage When Irrigation Works Deliver Water to Gila Valley Acres

ARIZONA'S Gila Project, famous name in irrigation, is again active. Dirt is flying; some at 10½ cents a yard. New equipment is there. Three major contracts are underway. When they are finished, Wellton-Mohawk Canal will be advanced 18½ miles from its takeoff from the Gila main canal near Imperial Dam on the Colorado River.

Fisher Contracting Co. of Phoenix, with the first 8½ miles, has naturally advanced the canal more than the other two contractors, whose jobs were let later. Fisher's \$1,335,463 Bureau of Reclamation contract started a year ago last month with 525 calendar days to go. Work is highballing.

Other active contracts include a 10-mile section by Morrison-Knudsen Co., Inc. Three pumping stations, which will lift water 171 feet, are under construction by United Concrete Pipe Corp. of Los Angeles. Both contracts are in the early stages, although M-K has roughed in several miles of its canal. M-K's familiar 5W Monighan boom can be seen by motorists on U. S. 80 near Wellton, about 25 miles east of Yuma.

Heavy Cut Excavation

While the 2,250,000 yards of excavation in Fisher's contract is common digging, it has not been without its unique features. In the dry state the ground is powdery and tends to run. Ground water showed up in part of the canal, making unwatering necessary to install the dense earth lining.

A Bucyrus-Erie 150-B crawler dragline with a 7-yard bucket and a 90-foot boom is handling the main block of canal excavation. A Koehring 605 and a Northwest 80-D dragline are dressing banks. Dragline casting is responsible for all but 180,000 yards of dirt. This operation is handled by tractor equipment.

The 150-B is working at the center line from a path prepared by bulldozers. The desert sagebrush was not too thick. In many places a smooth road was built by two D8's dragging a heavy chain between them.

The 150-B mucks out a center section leaving enough material along each side to keep the smaller machines busy. As irrigation canals go, this one is wide and shallow. Reclamation engineers had to design it that way to miss some of the ground water.

The 150-B carries its own source of power on skids close by. The power unit, a 438-kva Fairbanks-Morse generator driven by a Cooper-Bessemer 520-hp diesel, delivers juice at 2,300 volts.

After the 150-B dragline has mucked the center, the Koehring or the Northwest takes over, working from the top of the bank back of the slope stakes. The Northwest 80-D has a 3-yard bucket; the Koehring a 2-yard can. The 80-D set something of a record when it moved 112,000 cubic yards in 20 days, working around the clock as all excavating equipment does.

The smaller draglines cast the material over to the spoil piles already established by the bigger rig. Final slope dressing is being handled by the buckets from these draglines. The finished slopes are a source of pride to USBR District Manager M. J. Miller and Assistant District Engineer G. E. Tank.

As for big Ray Spangler, Fisher's Project Superintendent, he usually

looks down the slopes and scowls. He is just as proud of the good work as anybody. Tired, nearly deaf from six years under compressed air on the Delaware Aqueduct, Spangler is slowly recuperating in this setting of sun and sage, despite a schedule that would dismay an ordinary man. His big 280-pound 6-foot 4-inch frame is soaking up some of the sunshine.

New Equipment on Raised Canal

Approximately 180,000 cubic yards of canal bank is above the natural ground surface. It is being erected by tractor equipment, including some of the newer units in that line.

Two Euclid scrapers, each powered forward and rear by 185-hp General Motors diesels, haul 21 yards at a trip.



C. & E. M. Photo

The photographer was up to his knees in dust to take this picture of a new Euclid scraper working on Fisher's Gila Canal contract.

A D8 Caterpillar tractor helps them load. In some cases an Allis-Chalmers HD-19 pushes. The Euclid scrapers even assisted each other load for a time. The stunt was unique. The empty Euclid pushed the front machine to help it load. The loaded machine, using a hydraulic-operated hook, then acted

with snatch power to assist the rear machine.

Three D8's with 12, 15, and 17-yard Caterpillar scrapers are helping too. Generally speaking, the earth borrow is located near the banks. Ordinary one-way hauls are less than 600 feet.

(Continued on next page)



Goodyear's got the winning team of special-purpose tires

SURE-GRIP

Tops for drive-wheel traction on graders and pans.

ALL-WEATHER

Finest for flotation, rolling big loads faster.

BIG BOSS



—wherever **Super-Tough** tires are needed

PUT this famous Hard Rock Lug to work on your roughest jobs. See how it stands up under shock, bruising, enormous loads. See how tread and sidewalls are armored by massive lug bars as protection against cuts and rips—how its self-cleaning tread assures outstanding traction. Then—and only then—

can you fully appreciate the unmatched performance of this job-designed tire with its extra-thick undertread protecting an extra-tough carcass.

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GOODYEAR

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

Gila Canal Project Making Headway

(Continued from preceding page)

The dust is terrific. Operators wear respirators and dream of shower baths and back beer.

Raised earthwork is uncompacted, since its purpose is to act as backing for the dense compacted lining along the sides and bottom. The fill was made without adding moisture, since none was necessary.

Canal Lining a Problem

How would you put a 2-foot compacted-earth lining on the bottom and 8-foot sides of an irrigation canal? It's easy? That's what everybody thought. It was so "easy" that the first sure-fire scheme had to be junked because it wouldn't work!

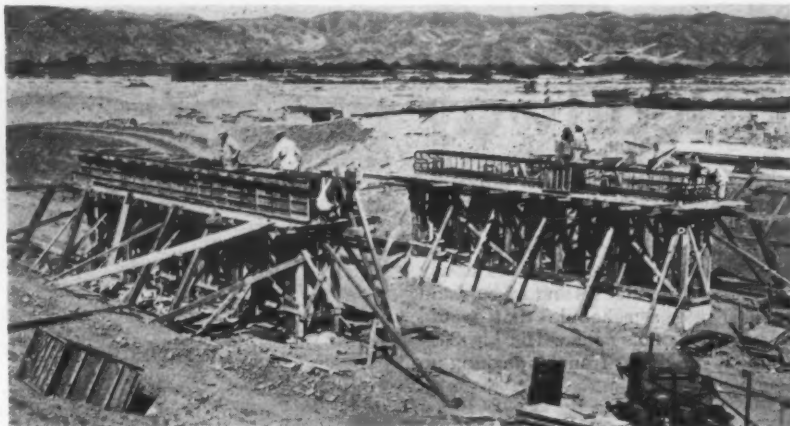
The borrow pit, where the earth lining material is found, contains some fine red clay . . . but it also is loaded with coarse rock. Those big rocks played hell with conventional methods of earth processing and compaction.

"Forget about 'em," is Spangler's advice. "We did."

Only two alternates seemed promising. The company could crush the big rocks down to size, or take them out. It chose the latter.

A large trap, designed to be fed by two bulldozers, is now to be erected in the ravines which mark the low point of the borrow pit. The trap will be spotted at three locations as work progresses. A grizzly will scalp rock which originally caused trouble. Water, pumped through a 4-inch line from the Gila Canal now in service, will spray into the dirt at two points: the first when it enters the grizzly trap, and again when it drops into the Euclid hauling units. This is expected to reduce processing time to a minimum at the lining. And time at that point is precious, because the dirt is only 8 feet wide on the sides, measured the way equipment moves.

Approximately a third of Fisher's canal will have to be dewatered before the lining can be placed in the bottom. Deep-well pumps with sumps are contemplated. Once the water is out of the way, earth lining can go in on top of the sandy bottom in the same manner as it goes in on the rest of the canal. The machines will dump their loads. Sheepfoot rollers will do the rest. The lining will be 2 feet thick on the bottom



C. & E. M. Photo

Carpenters frame pier forms for a bridge to cross Wellton-Mohawk Canal.

and 2.67 feet on the sides, measured at right angles to the slope, leaving a clear bottom width of 44 feet.

Riprap Quarried and Placed

The Wellton-Mohawk Canal skirts

the Gila River in many places, so close that flash floods would threaten the new work if the riverward sides were not protected from erosion. Dikes faced with rock riprap are placed at these points.

The rock is being blasted out of a chocolate-colored mountainside by about 1/2 pound of powder per cubic yard, after four Thor pneumatic drills and Timken rock bits sink the 20-foot holes necessary to shake the stuff loose. Springing isn't necessary. Apache bag powder from Benson, Ariz., is handy to the project. Each hole is strung up with a stick of gelatin and an electric blasting cap. The idea is just to shake the mountain loose.

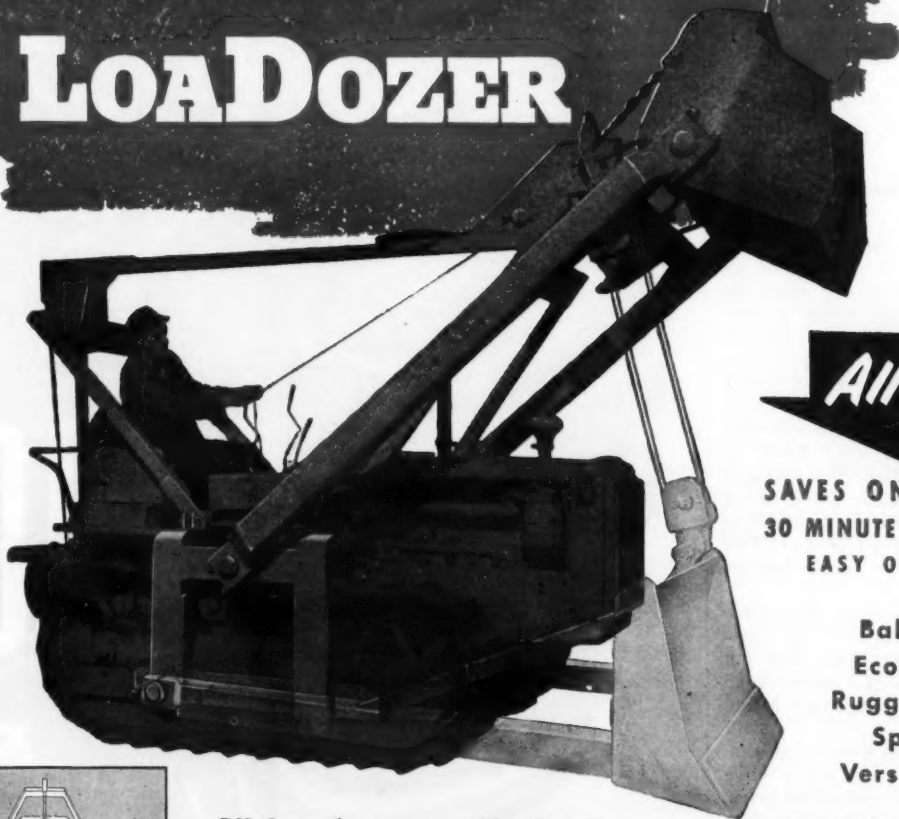
The Koehring machine is doing double duty here, changing over to a dipper stick and 1 1/2-yard dipper for rock loading. Several large White trucks with 20-yard trailer bodies haul the broken rock out to the river bank, where it is dumped over the side and spread by a D8 dozer.

Extensive Structure Work

The contract calls for 9 large structures and a few smaller ones. Wash siphons, overchutes, wasteways, canal crossings, and lateral turnouts are the

(Concluded on next page)

NOW-THE SOUTHWEST LOADOZER



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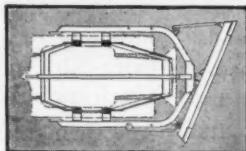
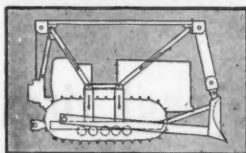
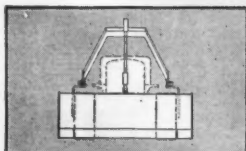
**Balance
Economy
Ruggedness
Speed
Versatility**

**ANOTHER EXAMPLE
OF Southwest's LEADERSHIP**

All these features are "built-in" qualities of the new SOUTHWEST "LOADOZER"—Extra

values that mean greater efficiency and economy in Loader and Bulldozer operations. Remember—you SAVE ONE TRACTOR—it takes only 30 MINUTES TO CHANGE OVER this combination Loader-Bulldozer unit.

- Built for all four makes of track type tractors.
- See your equipment dealer about the complete line of SOUTHWEST CONSTRUCTION EQUIPMENT.
- For complete specifications on this Loader-Bulldozer combination unit—WRITE FOR BULLETIN CM-11.

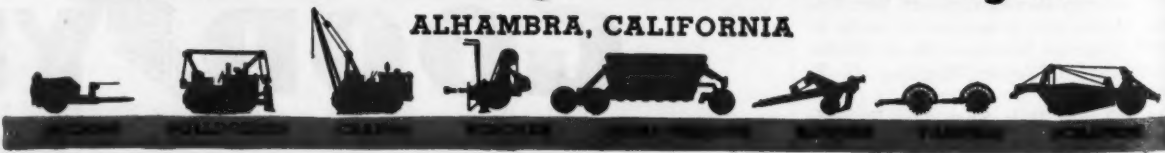


"Over Center Track Mounted" design gives perfect balance

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



RENT

**these cost-reducing
forms for concrete**

Cost records from job after job prove that Economy's system of Form Engineering and Rental Service means substantial savings in TIME—MATERIAL—MONEY for GREATER PROFITS.

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general types. By pushing the structure work at high speed through the winter months, Spangler hoped to have the last concrete done by June 1. That is the time of year when sizzling summer heat and the Bureau of Reclamation combine forces to crack down on concrete work, as a rule.

Conventional forming methods are being used. Most structures call for shiplap form facing nailed to 2 x 4-inch studs. Several bridge piers and one siphon structure were formed with Universal panels and ties. Warped transitions at wash siphons were extremely hard to form. These forms had to be made up in a central carpenter yard, checked against a plane surface, and trucked to the site.

Pours are made by a pair of Jaeger truck mixers which haul from a central batch plant. A small truck crane which is sometimes used to set forms also helps out on some of the pours.

The central batch plant consists of a Symons shaker screen and feeder trap, which classifies three sizes of rock. A conveyor then elevates this material to the bins of a Noble batcher, which also has a compartment for sand.

For a 2-yard batch, each mixer drives under the Noble plant and takes on 1,324 pounds of 1½-inch rock; 2,150 pounds of sand; 1,424 pounds of 1-inch rock; and 1,100 pounds of pea gravel. It then drives under a Noble 250-barrel cement batcher and takes on 1,112 pounds of Colton bulk cement. Water and 9 ounces of air-entraining agent are added, and the concrete is mixed when it reaches the pour. White-pigmented membrane solution is the curing agent.

The Bureau of Reclamation furnishes concrete materials. Fisher handles the aggregates at the feeder trap with a small Wagnermobile scoop, which is highly maneuverable and keeps the plant supplied. In all kinds of weather, with incessant wind, Fisher's men have pushed the structures through to where the end is now in sight. This in a place which, once you have seen it in winter, leaves no desire for heaven. Once you have seen it in summer, you have no fear of the other place.

Water!

Water! Green magic for a verdant land.

The Wellton-Mohawk Canal system will be everything men have ever called an irrigation canal. A lifeline, the pulsing heartbeat for 75,000 thirsty acres: it will be these things and more. Twisting and turning up the Gila River valley, crossing the river, coming back down the other side, the canal system will be nearly 70 miles long when present and future contractors get it done.

Three big pumping stations, pulsing with electricity from the Davis-Parker network, will raise the water. Six pumps in No. 1 station will raise 1,300 second-feet 31 feet. Five pumps in No. 2 will shoot 1,200 second-feet up another 85 feet. The third main lift, made by 4 pumps in No. 3, will put 900 cfs another 55 feet up in the air. From that point on, with the help of



C. & E. M. Photo

Concrete for a small wing-wall footing of a canal structure on the Gila Project is delivered by a Jaeger truck-mixer.

minor pumping, gravity will take over. What is now a desolate, sage-covered desert will soon be green with growing alfalfa.

Behind this accomplishment lie hours and days of tough excavation, mean lining, tedious formwork, trial-and-error concrete mixes, difficult engineering and design. But the builders aren't kicking.

A New Case-History File On Pressure-Treated Lumber

A 44-page illustrated report covering 25 years of service records for Wolmanized pressure-treated lumber has been announced by American Lumber & Treating Co., 332 S. Michigan Ave., Chicago 4, Ill. This report cites the case histories of more than 55,000,000 board-

feet of treated material in service and lists 581 specific installations where this clean-treated, decay and termite-resistant wood has been used. The file is the most extensive in the wood-preserving industry, the company states.

The introductory page to each section illustrates specific structures. A table of contents and summary page have been included for easy reference. The summary shows totals both by class of service and years of service.

"Use" classifications in the booklet break down to wet-process industries, docks and boardwalks, railroad structures, bridges and highway structures, mines, refrigeration plants, buildings (commercial and municipal), water works, and stadiums. More than 7,000,000 board-feet of the 55,000,000 total are between 20 and 25 years old. The first Wolmanized installation in the United States, now 26 years old, is still in service.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 53.

BLUE BRUTE USERS AGREE: "It's a Great Line of Mixers!"



FOR CENTRAL MIXING

This modern plant of the Clark Certified Concrete Company, Inc., of Baltimore, Md., produced 125,000 yds. of pre-mixed concrete during the past year. Vice-President Duncan writes: "Your Blue Brute 84-S Stationary Mixer has proven entirely satisfactory. Maintenance costs have been practically nothing."



FOR PORTABLE MIXING

Le Roy W. Vival, chief engineer of the O'Sullivan Rubber Corporation, Winchester, Va., reports: "We are extremely gratified by our Blue Brute 3½/5 Tilting Mixer, which has had two years of constant, severe use. It is extremely mobile, well constructed and performs excellently. Long exposure has not decreased its efficiency. The mixing cycle is fast and the mix consistently uniform. It is a pleasure to endorse and recommend this equipment."



FOR TRANSIT MIXING. President Bob McCorkle of the Abilene, Texas, Concrete Company, gives his reasons for re-ordering Blue Brute Hi-Up Truck Mixers: "We have compared competitive makes on our jobs and find your Hi-Ups best in every way. Maintenance costs have been negligible. Just purchased your first chain-drive Hi-Up and find it even better than the older machines — faster charging and discharging, easier to maintain and smoother running."



FOR PLACING. In building the Washburn vehicular tunnel under the Houston, Texas, ship channel, the "Trench method" of construction was used. The last yard or two of concrete placed in each of the section joints had to be placed straight upwards — a tricky pouring problem. Merritt-Chapman & Scott Corporation reports an easy solution was found with the aid of a Blue Brute Pneumatic Placer, which performed excellently.

Yes, among Blue Brute owners it's a never-ending story of more concrete at lower cost, trouble-free operation, time and money saved in every detail of mixing operations. Why not look into this proof that *there's more worth in Worthington?* See your nearby Worthington-Blue Brute Distributor, or write for bulletins on mixer types in which you're interested.



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IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

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PIPE LOCATOR

"The Greatest Improvement in Years"

MODEL 505

Consider these Features:

- Matchless Performance
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- Greater Depth—Simpler Control
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- All these and many more at a NEW LOW PRICE

THE ONLY PIPE LOCATOR WITH THE LIFETIME GUARANTEE

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WORTHINGTON

Precasting System Speeds 17-Acre Plant

A new system of precasting concrete foundation grade beams and curtain walls speeded the construction and lowered the cost of a 17-acre plant built for the Continental Can Co., near Pittsburgh, Pa., by Wigton-Abbott Corp., engineer and contractor of Plainfield, N. J.

All precasting was done on the site. Curtain-wall slabs and foundation grade beams were formed by pouring concrete on a flat, treated-concrete surface with removable edge forms. Steel inserts in the concrete were provided for handling and setting the slabs and beams and for fastening them to the steel columns, which were set on 20-foot centers in conventional poured-concrete footings.

The beams were fitted between the piers to grade level and the slabs set atop the beams to form a curtain wall up to the first-story sill. Slag was used as backfill against the grade beams to within 6 inches of the finished floor. As fast as the exterior piers and footings were poured, the grade beams and curtain walls were set in place by a power crane.

In order to have matched the speed of the precasting process with conventional poured-in-place construction, it would have been necessary to erect large areas of formwork at a time when the operation would have been interrupted by winter weather conditions. The new system eliminated the cost of conventional protection and heating. Wigton-Abbott also found that the desired surface finish was readily obtained, and that the cost of finishing precast slabs was considerably less than the cost of pointing up and rubbing poured-in-place wall after form removal.

The Continental Can plant has a floor area of approximately 700,000 square feet in a one-story combination manufacturing and warehouse structure, measuring 720 x 900 feet; a two-story section for administrative offices, measuring 240 x 60 feet; and a large reinforced-concrete mezzanine floor.

A Torque Converter Used on Truck Mixer

A new development in truck-mixer transmissions is a torque converter said to offer 50 per cent reduction in required horsepower, absence of shock loads, and greatly increased clutch life. Smaller engine size also reduces initial cost, operating cost, maintenance, and total weight, the company says. This new transmission, a development of The Transmission & Gear Co., 10421 Hagerty Ave., Dearborn, Mich., is called the Transo truck-mixer transmission.

Shock loads created by quick shifting from mixing direction to discharge, with the resultant heavy strain imposed on both clutch and transmission, are absorbed through the fluid flywheel of the new unit. Where the clutch was formerly subject to considerable wear through slippage, this slippage is now absorbed in the torque converter. Clutch engagement is positive before the load is picked up, the company states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 21.

Pipe Co. Rebuilds Plant

In less than two months after its old Sioux City factory was destroyed by fire last January, Concrete Pipe Machinery Co. was back in production in a reconstructed building formerly occupied by a truck-body manufacturer.

The main plant is 50 feet wide x 200 feet long, with a north extension 20 x 100 feet for offices and a south extension 16 x 180 feet for a grinding room and



A view of one of the exterior walls of the new 17-acre Continental Can Co. plant near Pittsburgh, by Wigton-Abbott Corp. The concrete foundation grade beams and curtain walls were precast on the site by a new Wigton-Abbott process.

raw-material storage. A 40 x 80-foot warehouse is being reconstructed across the street to house facilities for manufacturing pipe molds and jackets.

Three miles away, the site of the burned-out factory is being cleared for the building of a pipe plant. The new

plant will house and put into production the latest Model D drain-tile machine. The company is also developing a new Model TT machine which will handle 6-foot lengths. For the first time in 5 years, the company says, the McCracken Packer-Roller-Head Pipe

Machine can be delivered within 30 days after receipt of order.

Catalog on Wire Rope

A new bulletin designed as a quick reference for information pertaining to improved-plow-steel wire rope has been prepared by Macwhyte Co., Kenosha, Wis. All sizes and construction classifications are combined in one large table, with several changes made to bring these data up to date.

Monarch Whyte Strand Bulletin No. 50-25 also contains information on how to order wire rope, and explains and describes wire-rope constructions.

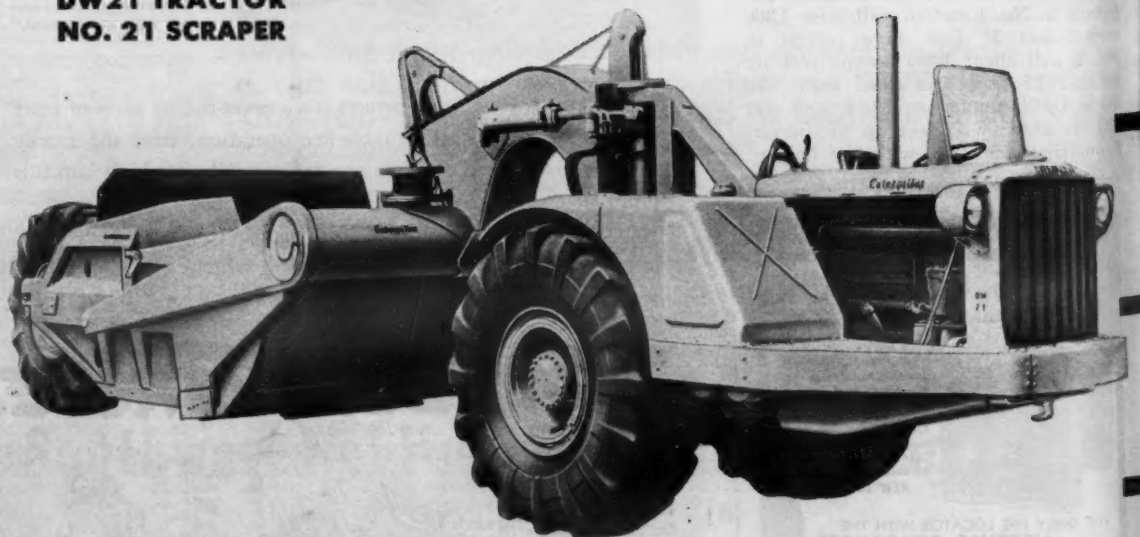
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 108.

2 GREAT NEW ADDITIONS TO

DW20 TRACTOR
W20 WAGON



DW21 TRACTOR
NO. 21 SCRAPER



Accompan-
ized (below)
this big-cap-
17 cu. yds. c-
Travel speed
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Generous siz-
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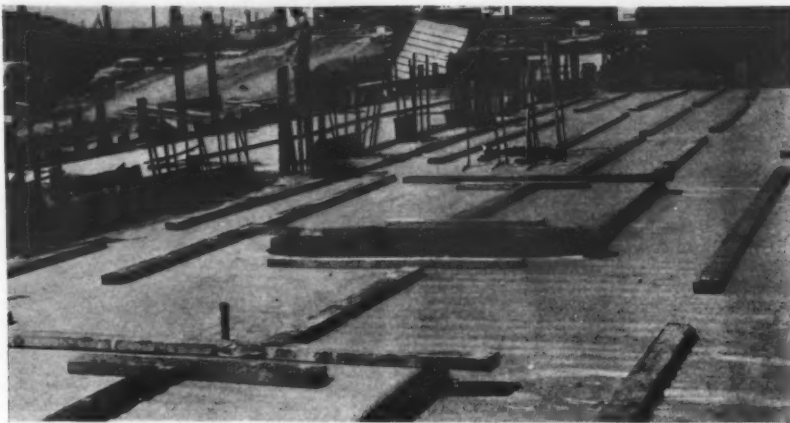
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A Reinforced Paper For Concrete Curing

A new reinforced paper for concrete curing has been announced by the Angier Corp., of Framingham, Mass. It is said to be scuffproof, waterproof, and shrink-resistant. The paper is manufactured by bonding together with asphalt two sheets of special chemically treated kraft. The paper is reinforced for tear resistance with jute cross cords running both longitudinally and laterally throughout the sheet. These Protect-O-Mats can be used many times. They are available in rolls 36 to 96 inches wide, in lengths of 100 yards. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 87.



Protect-O-Mats were used to cure the concrete floors of three drying furnaces for the new San Francisco sewage-disposal plant.

Multi-Use Buildings, Steel and Aluminum

A variety of special small-sized buildings for use as shops, field offices, or storage sheds are fabricated by John Cooper Co., Inc., 293 Second St., Hackensack, N. J. They feature structural-steel frames with galvanized-steel or aluminum siding and roofing. The company points out that these buildings are fireproof, weathertight, durable, and easily dismantled and re-erected. Each building is designed to suit individual requirements.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 84.

Number One in Maintenance: Lubrication of Equipment

Earth-moving and construction machinery is continually exposed to the ravages of weather, mud, water, dust, and sand. Operators must see that seals intended for equipment protection are not broken or made useless, so that bearings and other friction surfaces are assured an effective lubricating film, free from contaminants. Preventive maintenance of this kind as it applies to lubrication is completely outlined and discussed in a new 50-page booklet prepared by Cities Service Oil Co., 60 Wall Tower, New York 5, N. Y.

The first portion of the booklet "Earth Moving and Construction Machinery Lubrication" broadly discusses lubricants, their properties, and their functions. The second and third portions of the book are devoted to the machine elements, parts, and assembly units that require lubrication. They point out that contractors' equipment, although made up of a number of machines performing different tasks, depends upon relatively few types of mechanisms. Therefore, they treat separately each of these parts—bearings, gears, chains, tracks, clutches, hydraulic systems, and swing, crowd, and boom-operating mechanisms. The booklet illustrates the lubrication requirements of each part and traces its relationship to the complete machine.

A 4-page chart lists each part or unit, tells how it is to be lubricated, and recommends lubricants. In addition to the treatment of road and heavy-construction machinery, the booklet also covers gasoline and diesel power sources, air compressors, pneumatic tools, and pumps. Photographs show the units and their component parts, and engineering drawings show important assemblies.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 81.

Power Shovels and Cranes Described in New Catalogs

Two new catalogs recently released by the Thew Shovel Co., Lorain, Ohio, describe the Lorain-50 and the Lorain-TL series of power shovels and cranes. The first of these highlights the hydraulic coupling which is standard on the Lorain-50 series. It also describes and illustrates the new swing clutches, one-piece cast-steel turntable bed, and air-controlled steering. The Lorain-50 is available in four different-size crawlers and two rubber-tire mountings, all convertible to shovel, dragline, clamshell, crane, and hoe.

The 18-page catalog on the Lorain-TL series explains that these machines, which are in the 1/2 and 3/4-yard class, may be mounted on a variety of crawler and rubber-tire mountings. They include the self-propelled and the Moto-Crane models. The interchangeable unit or package assembly is graphically illustrated in a series of phantom or buildup views.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 10.

TO THE "CATERPILLAR" LINE

—TO BRING YOU STILL GREATER EARTHMOVING CAPACITY AND SPEED

Accompanying the Tractor features generalized (below, right) the Wagon member of this big-capacity unit offers:

17 cu. yds. capacity, struck; 25 cu. yds., heaped.

Travel speeds, through tractor's 5 gear ratios, ranging from 2.88 to 26.6 m.p.h.

Generous size hopper to provide good target for shovel or dragline loading.

Controlled dumping . . . openings can be varied without mechanical adjustment—permitting either dumping or windrowing.

Accurate hydraulically controlled dumping with positive mechanical lock on dump doors.

THE DW20 TRACTOR AND NO. 20 SCRAPER UNIT

The "Cat" No. 20 Scraper is available also for the DW20 Tractor. It has the same capacity and general specifications (except in type of gooseneck) as the No. 21 Scraper described below.

THE ENGINE: Both prime movers have the new 6-cylinder "Cat" Diesel Engine . . . 275 HP. peak capacity at 2,000 r.p.m. tested in accordance with A.S.M.E. Power Test Codes; 225 HP. at 1,900 r.p.m. available at the flywheel.

Accompanying the Tractor features generalized (right), the 2-wheel DW21 offers:

Full 90° turn each way.

Travel speeds, through 5 gear ratios, ranging from 2.16 to 20 m.p.h.

Scraper capacity is 15 cu. yds., struck; 19 1/2 cu. yds., heaped. (With available 12" extensions, 18 cu. yds., struck; 22 1/2 cu. yds., heaped.)

Bowl and apron are designed to promote "boiling" action of earth through center of load—for full-measure yardage and minimum loading time.

Large low-pressure tires for easy load flotation.

"Dozer-type" ejection for positive "kicking out" of sticky material; dependable spring-action ejector return.

Open bowl design to permit visible loading under shovel or dragline.

Adjustable rear axle to permit level cuts and desired settings.

Double bottom of special alloy steel. Self-sharpening reversible cutting edge.

High apron lift, low center of gravity.

FOR high-speed hauling . . . for high production . . . "Caterpillar" offers two new earthmoving units—the 4-wheel DW20 and the 2-wheel DW21.

With a completely new 6-cylinder Diesel Engine producing 225 HP. available at the flywheel, the newcomers give users their choice of high-speed wheel-type prime movers.

The DW20, with top speed of 26.6 m.p.h., has 2 design matched trailed units . . . the "Cat" W20 Wagon (25 cu. yds. heaped capacity) and the "Cat" No. 20 Scraper (19 1/2 cu. yds. heaped capacity).

The DW21, with top speed of 20 m.p.h., trails the "Cat" No. 21 Scraper (19 1/2 cu. yds. heaped capacity).

And, as always, "Caterpillar" quality, dependability, durability and work capacity are built in . . . backed by the unparalleled parts and service facilities of the worldwide "Caterpillar" dealer organization.

For further information on these two new units, contact your dealer or write the factory.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

TRANSMISSION

Constant-mesh transmission, and heavy-duty clutch. Special locking device that prevents gears from becoming disengaged.

BRAKES

Each large, heavy-duty brake is 22" in diameter, 7" wide. Compressed air energized brakes on both tractor and drawn member of unit. Handy control valves for applying both sets of brakes, and to right or left driving wheel.

STEERING

Hydraulic booster steering that follows the natural "feel of the road" hand guidance. Heavy steel stops for keeping gooseneck of drawn equipment from jackknifing.

OPERATOR COMFORT

Airfoam rubber cushion on bucket-type seat mounted on coil spring with hydraulic snubber. All controls within easy reach. Excellent visibility.

CATERPILLAR

DIESEL ENGINES • TRACTORS
MOTOR GRADERS • EARTHMOVING EQUIPMENT

Concrete Expressway Gets Going in South

A Dual Three-Lane Highway At Atlanta Under Way With 1.3-Mile Contract Completed; Subgrade Is Stabilized

THE first contract on the Atlanta Expressway—on the north leg of the new route from Merritts Avenue north 1.3 miles to 16th Street—has been completed. The State Highway Department of Georgia awarded a contract for grading, drainage, paving, and grade-separation structures on this section to the MacDougald Construction Co. of Atlanta on its low bid of \$1,327,542.76. Work started in March, 1949, and was scheduled for completion by September 30, 1950. Sharing in the financing are the State, 31 per cent; Federal government with a like amount of 31 per cent; and Fulton County supplying the remaining 38 per cent. The expressway is designed with a total length of about 32½ miles, and will take from 10 to 15 years to complete. Essentially it will keep traffic moving about and through the metropolitan area of the state capital. (See C. & E. M., February, 1949, pg. 50.)

The expressway is the last word in modern highway standards, with three lanes of concrete pavement in each direction separated by a grass median strip. It has limited access with no crossings at grade and is designed for 50-mph speeds. Grade-separation structures carry North Avenue, 5th Street, 10th Street, and 14th Street over the expressway. At 3rd Street, a pedestrian underpass dips beneath the new wide road. The route is lighted throughout.

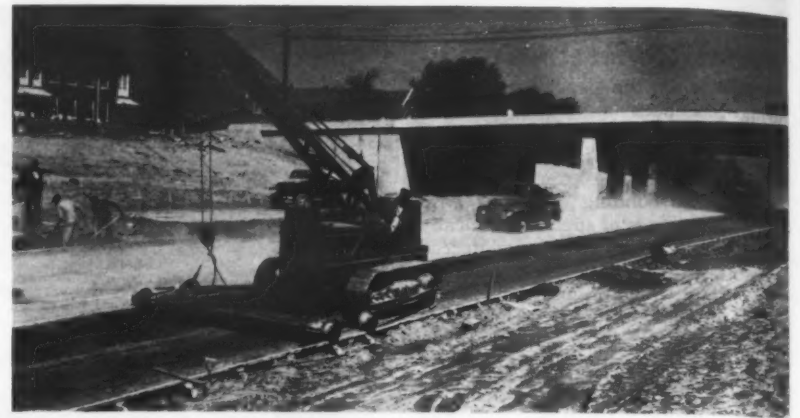
Right-of-way was acquired by the City and County. In a typical section, the right-of-way strip that takes in the roadway to the toe of slopes in the depressed section is 107 feet wide. Easements to the tops of these slopes were secured from adjoining property owners.

Typical Section

A typical section through the expressway shows two 38-foot roadways, each made up of three 12-foot lanes of 8-inch plain concrete. The two inner lanes slope to the outside at the rate of

¼ inch to the foot, while the outside lane pitches ¼ inch to the foot. On the inside is a 2-inch raised-edge concrete curb; and on the outside, an 8 x 30-inch combination concrete curb and gutter adds the extra width to bring the roadways to 38 feet between curbing. The grass median strip, 14 feet wide, is raised at the center with slopes ascending 1 inch to the foot. Stabilized shoulders 8 feet wide slope upward, also at the rate of 1 inch to the foot. Beyond the shoulders, the side slopes are variable—3 to 1, 2 to 1, and 1½ to 1.

Drainage therefore runs down the shoulders and is carried off by roadway drains. Just off the pavement are storm sewers with connections to 195 manholes and drop inlets. Pipe installed totals around 18,000 linear feet, from



C. & E. M. Photo

An International TD-14 tractor with a crane attachment pulls a subgrade planer between the middle concrete lane of the expressway and the outside road form.

6-inch perforated tile up to 42-inch concrete mains. They outlet into the city sewer system.

Paving is laid on a subgrade stabilized to a foot beyond the concrete with crushed-granite aggregate. The 12-

foot lanes have longitudinal key construction joints, transverse expansion joints at 600-foot intervals, and contraction joints at 30-foot intervals. The lanes are clearly marked with 4-inch

(Continued on next page)

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black traffic stripes permanently applied along the edges.

Grading

Below 6th Street on the new right-of-way, the City cleared many residences from the path of the road builders. North of 6th Street, the contractor encountered a number of large trees that had to be moved to make way for the expressway. He razed these by running power shovels up to them and pushing them over with the dipper stick. Excavation of the unclassified type ran close to 500,000 yards, of which around 30,000 yards was rock. The entire job, including approach ramps, was undercut for the special subgrade treatment. There was a surplus of material, about 200,000 yards, but this was wasted to good purpose on the adjoining grounds of Georgia Institute of Technology where a drill field was built up to a desired grade.

The entire 1949 construction season was a steady grading operation. The bulk of the dirt, a sandy-clay red soil, was excavated by three 2½-yard shovels and moved by a fleet of Euclids—9 end-dumps and 6 bottom-dumps. Rock equipment included wagon drills, jackhammers, and compressors. Fills were laid in 6-inch layers loose measure, spread by dozers, and compacted by sheepfoot rollers to a density of 95 per cent standard Proctor.

The 8-inch special subgrade treatment was crushed granite with 100 per cent passing the ¾-inch screen. At the start of the job this material was supplied by the Tyronne Rock Products Co. of Atlanta, but when the contractor got into the rock cut, he hauled the large chunks off to his own commercial crusher and processed the material himself. The crushed granite was put down in one lift and incorporated with earth binder by a Seaman Pulvi-Mixer. It was compacted by sheepfoot rollers to a Proctor density of 123 pounds per cubic foot. The surface was also rolled by rubber-tire traffic rollers and shaped by motor graders.

Structures

Henry Newton Construction Co. of Decatur, Ga., was given a subcontract for building the structures. The concrete pedestrian underpass at 3rd Street is 10 feet wide x 8 feet high x 123 feet long, and is equipped with a blower for ventilation. The four overhead bridge crossings are similar in type and are designed for H20-S16-44 loading. They have concrete abutments and center pier, supporting continuous steel I-beam stringers on an average 6-foot spacing. The bridge deck is a 7-inch reinforced-concrete slab.

All bridges are around 220 feet in length and have a minimum vertical clearance of 14 feet 3 inches. The North Avenue bridge is the widest, with a 72-foot roadway and two 12-foot sidewalks. The 5th Street bridge has a 42-foot roadway, while the other two spans have 48-foot roadways. Sidewalks on the other three bridges are 8 feet wide. Wrought-iron extra-strength pipe railing on the outside of the walks leans inward at a 10-degree angle off the vertical.

Concrete Paving

Concrete paving of the expressway was sublet to the Ballenger Paving Co. of Greenville, S. C. By December, 1949, grading and subgrade treatment had advanced sufficiently to permit the start of paving. With a month of good weather, about one-third of the concrete was laid. Then the job was shut down when the weather turned cold, and started again on March 23 of this year. Paving was finished in May. The procedure was to pave a 24-foot width, including the two inner lanes, with the paver working outside the forms; then to pave the adjoining 12-foot lane with the paver operating on boards laid on the concrete. The concrete was laid

inside Heltzel forms, of which there were 6,000 linear feet on the job.

Fine-grade was prepared by a Caterpillar No. 12 motor grader, and the forms were set by hand. Then an International TD-14 tractor with boom attachment pulled a subgrade planer over the grade to remove excess material. This was followed up by rolling with a Buffalo-Springfield tandem 3 to 5-ton roller. The grade was wet down from a tank truck. Pine-board expansion joints, ¾ inch thick x 7¾ inches high, were installed at 600-foot intervals. They were left ¾ inch low for later sealing with asphalt. Dowels go through the expansion joints, and through only three of the contraction joints on each side of the expansion joint. Dowels are ¾ x 16 inches and are on 12-inch

centers.

In the longitudinal key construction joints, ½ x 40-inch deformed tie bars are spaced 42 inches center to center. These bars are between the lanes and also tie into the combination concrete curb and gutter. When the full 24-foot width was being paved, the dowels were embedded in the concrete by a new Heltzel dowel-installing machine, which vibrated them to the required half depth. For the ties to the adjoining lane, holes were made in the forms for the insertion of the bars.

Batching

While the actual paving was sublet, MacDougald batched the materials for the pavement concrete at its commercial plant only 2 miles from the job.

Southern States portland cement from Rockmart, Ga., was used in the mix, along with sand from the Atlanta Sand & Supply Co., and crushed-granite aggregate from the Stockbridge Stone Co., both of Atlanta. The weights of a typical batch were as follows:

Cement	716 lbs.
Sand	1,432 lbs.
Stone, No. 3	1,130 lbs.
Stone, No. 57	1,937 lbs.
Water	39 gals.

This batch produced 1.38 yards of concrete with an air content of 4 per cent. The air was obtained by adding 6 ounces of Darex air-entraining agent to the batch at the paver by means of an automatic dispenser. As the paver skip was raised to charge the drum, it tripped a release discharging the Darex

(Concluded on next page)

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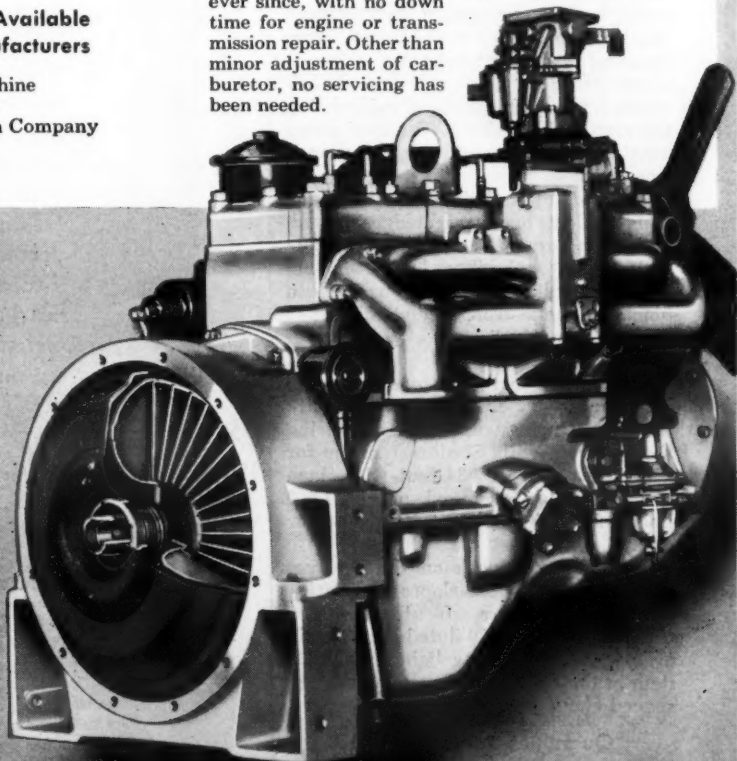
A Typical Experience

Five years ago, a Rex Moto-Mixer equipped with Chrysler Industrial Engine and gyrol Fluid Drive was placed in operation by the Tews Lime and Cement Company of Milwaukee. The unit has been operated continuously ever since, with no down time for engine or transmission repair. Other than minor adjustment of carburetor, no servicing has been needed.

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C. & E. M. Photo

Paving and finishing equipment lines up on a depressed section of the Atlanta Expressway at the North Avenue bridge.

Concrete Expressway Gets Going in South

(Continued from preceding page)

into the batch.

The gradation of the crushed granite and sand making up the aggregate for the mix was as follows:

Sieve Size	Per Cent Passing	
	Stone	Sand
2 1/2-inch	100	....
2-inch	95-100	....
1 1/2-inch	35-70	....
1-inch	10-30	....
No. 4	0-5	95-100
No. 16	....	45-95
No. 50	....	10-30
No. 100	....	2-8

Finishing

Batches were hauled by the Shinall Trucking Co. of Cartersville, Ga., using a fleet of 15 trucks holding two batches each. They were mixed one minute in a Koehring 34-E Twinbatch paver which was supplied with water from a 1,250-gallon GMC water-tank truck. Two such units kept the water flowing to the paver. While one was getting filled from a standpipe attached to a city hydrant, the other was pulled along by an Army half-track that followed the paver. A Jaeger 3-inch pump mounted on the half-track transferred the water from the tank to the paver through a 100-foot length of 2-inch hose.

Batches were discharged between the oiled forms onto the wet subgrade in front of a Blaw-Knox paddle-type spreader. The use of a vibrating screed attached to the spreader permitted concrete with a slump of 3/4 to 1 inch to be poured. When pouring the 24-foot width, the rest of the finishing equipment that followed included a Blaw-Knox finishing machine, a Koehring Longitudinal Finisher, and the Heltzel Flex-Plane machine for inserting the tie bars and also the 1/4 x 2-inch steel strips for the contraction and longitudinal joints. On the 12-foot lane, finishing equipment behind the Blaw-Knox spreader included a Jaeger-Lake-wood 2-screed finisher and a Koehring Longitudinal Finisher. The steel strips for the contraction joints were inserted from bridges.

The surface was checked with long-handled floats and straightedges, belted, and edged around the joints with a 1/4-inch-radius tool. The last operation was the application of Raven Black, a black magnetic iron oxide which was put on in a 4-inch strip at the edge of the lane. This material penetrates 1/2 inch into the concrete to form a permanent center stripe. It was put on with trowels. Curing was done by covering the concrete with Sisalkraft paper for 72 hours. On the 24-foot-wide lane the contractor averaged nearly 1,000 linear feet of pavement in a 10-hour day.

Final cleanup work on the contract included sodding the slopes and sprigging the shoulders. It also included the installation of 129 fluted light standards with overhanging lights, a \$93,000 item in the contract. The standards are spaced about 150 feet apart.

Quantities and Personnel

The major grading and paving items

in the 1.3-mile expressway contract included the following:

Unclassified excavation	465,315 cu. yds.
Subgrade treatment	15,000 cu. yds.
Plain concrete pavement, 8-inch	64,321 cu. yds.
Concrete pavement (colored black for ramps), 8-inch	8,064 sq. yds.
Concrete raised-edge curb, 2-inch	12,060 lin. ft.
Concrete curb and gutter, 8 x 30-inch	21,575 lin. ft.

The MacDougald Construction Co.

employed a force averaging 125 on the grading and drainage work under the direction of Ralph Armistead, Superintendent. For the Ballenger Paving Co., Jim Chandlee was Superintendent with a crew of between 55 and 60 men.

For the State Highway Department of Georgia, Charles H. Breedlove was Resident Engineer on this initial grading and paving contract. Project Engineer W. P. Smarr represented the Department on the bridge construction. Contracts on this section of the expressway are under the general supervision of H. D. Loach, Highway Engineer.

Present work, either already under construction or soon to be awarded to contract, covers 12.75 miles of the Atlanta Expressway. The cost of this construction totals around \$26,700,000.

Jim L. Gillis is Chairman of the State Highway Board, and M. L. Shadburn is State Highway Engineer.

Regular purchase of U. S. Savings Bonds means personal security as well as a share in the national security.



C. & E. M. Photo

An old Atlanta streetcar serves even in its retirement—as a field office on the Atlanta Expressway job. Resident Engineer Charles Breedlove of the Georgia State Highway Department, and Charles Ballenger, President of Ballenger Paving Co., relax a minute on the stoop to talk over plans of operation.

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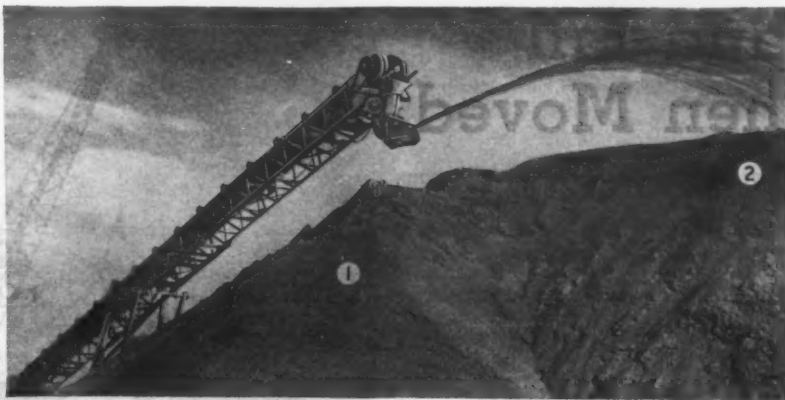


TEXACO

Increases Conveyor Stockpiling Range

A new Swivel-Piler developed by Stephens-Adamson Mfg. Co., Aurora, Ill., is designed to increase the volume piled by a portable or fixed conveyor up to 10 times without moving the conveyor. It will throw material to a peak height of 3 feet above the conveyor discharge over a radius of 20 feet, thus eliminating frequent conveyor moves or extra storage conveyors.

The piler consists of a standard centrifugal thrower and hopper pivoted between brackets for mounting on any conveyor. A swivel crank, shaft, and supports are also furnished to permit the user to direct the thrower discharge. This unit will handle sand, stone, lime, and other bulk materials in sizes up to 2 inches. A stream of material can be directed while the conveyor is transmitting material. It can be swiveled horizontally to any direction by means of a cable reeved from the thrower unit to the swivel crank. This may be



No. 1 shows the volume of material piled by the conveyor only. No. 2 shows how the Swivel-Piler increases the storage volume in any direction.

located at any convenient position on the conveyor frame. The Swivel-Piler has a capacity up to 50 tons per hour, depending upon the material.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 106.

New Mack Vice President

W. H. Schneider succeeds J. E. Savacool, who is retiring, as Vice President-Comptroller of Mack Trucks, Inc., New York City. Mr. Schneider has also been elected to the Board of Directors.

New Hydraulic Drive Acts as Master Clutch

A new type of hydraulic drive has been engineered by the Twin Disc Clutch Co., Racine, Wis. It "dumps" the hydraulic fluid, when desired, to serve as its own master clutch and provide a complete disconnect between the prime mover and the load. Except for the disconnecting feature, the new HUD unit is similar to other Twin Disc double-circuit hydraulic couplings in both design and operating characteristics.

To act as its own master clutch, the new coupling is capable of dumping the hydraulic fluid in from 1 to 4 seconds, depending upon the speed of the coupling. When a control valve is actuated to cut off the oil supply, the hydraulic fluid is rapidly released into a reservoir through four differential pressure dump valves in the outer diameter of the coupling. With the hydrokinetic connection broken by the absence of the oil, the engine or motor can continue to run indefinitely without harm to the coupling or driven equipment. Special provision is made for adequate lubrication during these periods. When the control valve is reset to engage the load again, differential pressure valves on the coupling's outer diameter close. This permits the coupling to refill quickly for normal hydraulic-coupling operation.

The new coupling is said to save weight and space commonly devoted to a master clutch and to provide all the other features of a hydraulic drive, such as smooth pickup of the load, protection against stalling, and absorption of sudden shocks and overloads. The disconnecting coupling is expected to be of special advantage in excavating and hoisting equipment, logging yarders and loaders, and engine compound drives. The new Model HUD disconnecting coupling is available in 21 and 27-inch sizes, with other smaller sizes to follow.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 98.

Snow-Fighting Equipment

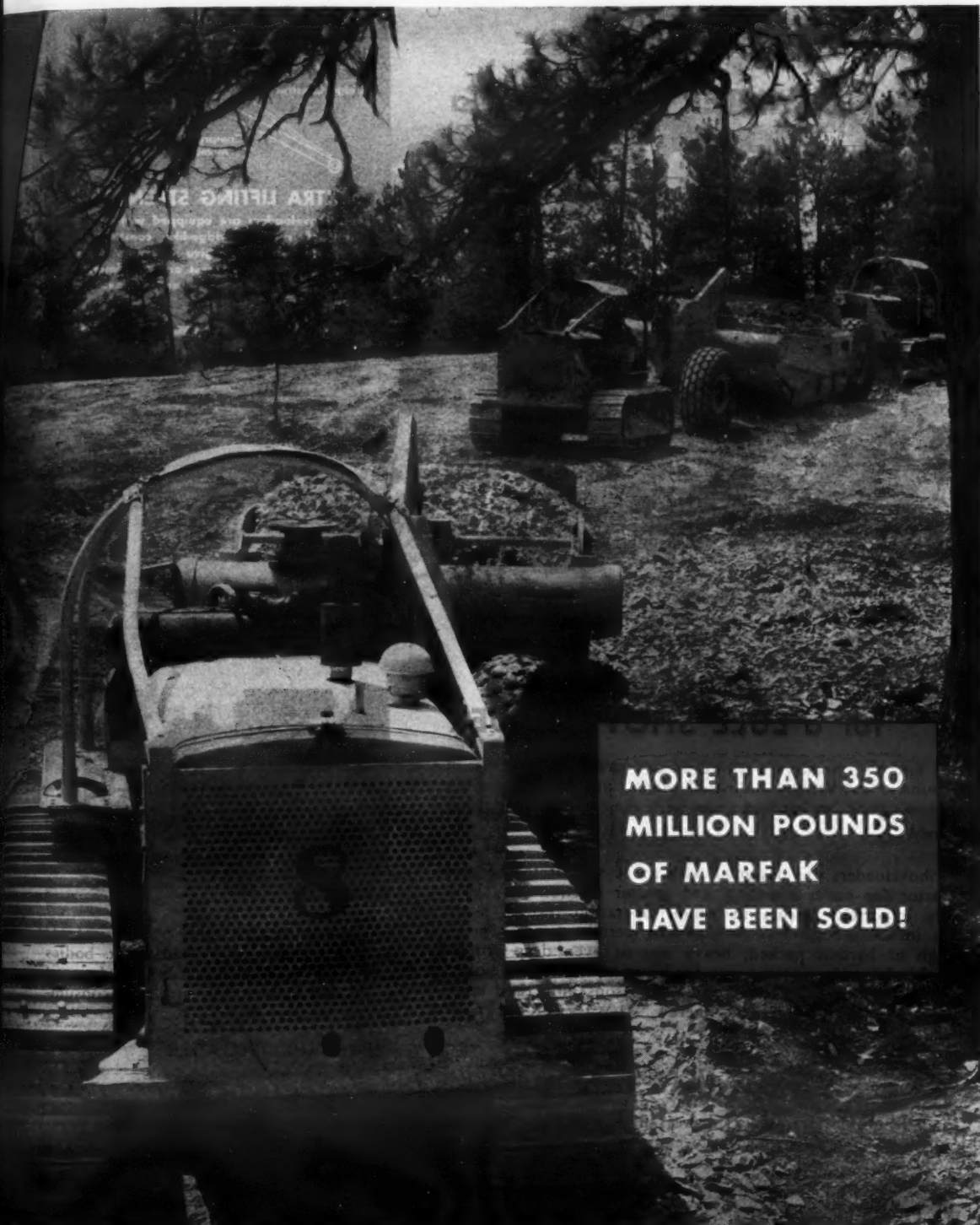
Highway departments, road commissions, and contractors responsible for snow-removal operations will be interested in a new 16-page booklet called "Beat Back the Snow With Caterpillar Equipment", offered by Caterpillar Tractor Co., Peoria 8, Ill.

For the past two years the company has sent photographers into areas where snowfall has been heavy and at times disastrous. Taken under working conditions, the photos show how maintenance crews and snow-removal equipment keep highways, farm-to-market roads, and city streets open to traffic during the winter months. The new booklet tells its illustrated story of how snow, threatening many regions for almost one-half the year, challenges commerce, industry, and life itself. All types of Caterpillar snow-fighting equipment are shown.

This literature may be obtained from the company by requesting Form 30023, or by using the Request Card at page 16. Circle No. 117.

Koehring Sales in West

Sales of Koehring, Parsons and Kwik-Mix construction equipment in northern California and Nevada are being handled from the Koehring Co. West Coast Division office in Stockton, Calif. Bay Cities Equipment Co. and Moore Equipment Co. previously covered this territory for Koehring. Leo J. Lamley, former Koehring District Representative in the west-coast area, is in charge of sales. Harold Buckler, District Representative in 11 western states for the C. S. Johnson Co., a Koehring subsidiary, has his headquarters at the Stockton office.



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FOR ALL CONTRACTORS' EQUIPMENT

Airport Cut and Fill Mapped, Then Moved

Grading Adds 800 Acres to Lambert Field at St. Louis As Contractor "Highballs" 3,000,000-Yard Project

THE development of Lambert Field at St. Louis, Mo., has since its inception been a battle with stubborn clay, ground water, and bad drainage. Over the years the City of St. Louis, the CAA, and some of the national defense agencies have gone ahead slowly but surely, keeping the airplane capacity of the municipal airport ahead of predictable needs.

The latest job is a big 800-acre addition at the east end, near Coldwater Creek, which involves about 3,000,000 cubic yards of grading, and extensive drains construction. McCarthy-Pohl Contractors, Inc., of St. Louis and Nevada, Mo., is handling the grading. The firm has subbed the drains construction to Tarlton Construction Co., of St. Louis.

When the last diesel engine is cut off late this year to mark the completion of this airport addition, the ground will be ready for a 2,600-foot extension to the main runway, a new runway 6,200 feet long, the necessary taxiways and apron, and the new administration building. For a period of 18 months, not including the winter shutdown from December 9, 1949 to April 24, 1950, machines will have worked.

Flatten Rolling Ground

Grading consists generally of a cut-and-fill process in terrain so rolling that 30-foot cuts are not uncommon. The work carries the flat airport terrain through some of the heaviest grading yet encountered.

For the most part the material is clay. There is a 10-foot layer of black gumbo topsoil, with heavier, wet clay below that. The nature of this dirt governed to a large extent the selection and use of equipment.

A predetermined balance of cut and fill areas was elaborated upon by the contractor's engineering department, with the result that a ground map in various colors was prepared. When the

theoretical movement of dirt had been figured down to fine accuracy, the map showed seven areas as follows:

Area Designation	Approx. Yardage	Haul Width Length (Feet)
Red	444,000	800
Orange	73,000	600
Black	367,000	1,200
Green	893,000	2,800
Blue	57,000	600
Purple	740,000	2,000
Yellow	370,000	800

Obviously the red, orange, blue, and yellow areas then fell within economic feasibility for tractor-scraper equipment, for the one-way hauls were 600 to 800 feet. The black area was a fringe zone where either track-type or wheel-type equipment could be employed. The green and purple zones, with their long hauls, indicated that wheel-type

(Continued on next page)



C. & E. M. Photo
A Thew-Lorain dragline using a 3-yard Hendrix bucket loads Lambert airport clay to a bottom-dump Euclid. McCarthy-Pohl Contractors, Inc., is handling the project.

Operators Agree... There's NO WINTER LAYOFF for a Lull Shovel loader



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Lull Shovel loaders are designed with more weight to the rear of tractor for easier handling and greater traction... both mighty important factors in winter operation. Power down crowd instantly controlled by operator permits a quick break through of hardest packed, heavy wet or even deep crusted snow. Ideal for clearing the way for heavy traffic or other operations. These are but a few of many reasons more and more experienced operators agree... there's NO WINTER LAYOFF for Lull Shovel loaders.

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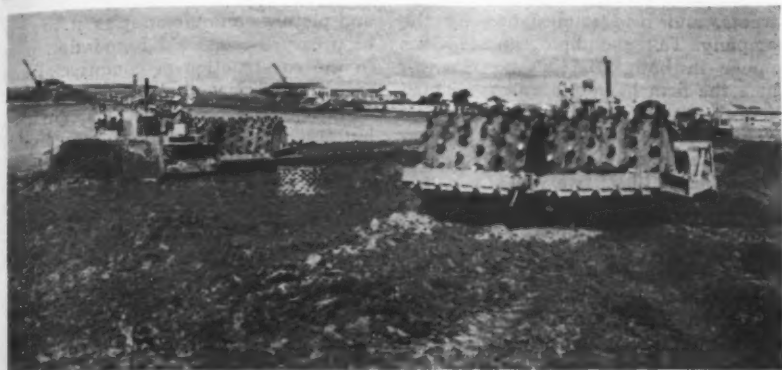


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C. & E. M. Photo
Grace sheepfoot rollers compact dirt at Lambert airport to produce 95 per cent density.

hauling equipment could be used to the best advantage.

The grading plan consisted, then, of a few simple fundamentals. Equipment would first be selected on the basis of the ground map. It would be operated by the best possible operators in the St. Louis labor union, and maintained by good mechanics. The theoretical cut-and-fill plan would be followed as close to the letter as empirical field rules permitted.

Two Equipment Fleets

Equipment was selected for two separate "spreads", distinct in their application. The tractor-scraper fleet consisted of ten units. Eight Caterpillar D8 tractors and two International TD-24's furnished the power. Their companion scrapers consisted of six Caterpillar 80's, two LeTourneau 17-yard Carryalls, and two 14-yard Carryalls. Two D8-mounted dozers, a D8 and TD-24 pusher tractor, and two D7's with heavy Grace sheepfoot rollers completed that spread.

For fringe hauls, or long hauls where necessary, there was an electric Tournapull, and two of Euclid's new scrapers, each with twin General Motors diesels. These fast units were generally used to perform the close grading the scrapers could also do, and to make the long hauls to the fill zones.

The wheel-type spread centered around three 10-yard Caterpillar DW10's and eight 13-yard bottom-dump Euclids. A pair of D8's with dozers, a D7 with a Grace roller, and two Caterpillar No. 12 motor graders completed the picture. The clay was sufficiently wet that no water-tank equipment had to be used. Loading equipment for the DW10's and Euclids consisted of two Thew-Lorain 820 draglines with short booms and 3-yard Hendrix buckets.

Grading Methods

The theoretical cut and fill areas were carefully flagged by surveyors before the equipment ever moved in. This gave supervisors and operators a good look at the way the job lay. In both spreads, the dirt was loaded and disposed of with the least amount of effort or haul. In other words, dirt graded close to the division between cut and fill in one zone was usually hauled to the far side of the fill zone to retain the haul balance.

After a cut had been opened, it was especially vulnerable to rain. For this reason, cut zones were opened up sparingly, and every effort was made to clean up a cut once it was opened. Conversely, the dense, compacted fills were somewhat resistant to rain, and the surface dried rapidly when the sun and wind appeared. No great effort was needed, therefore, to protect the fills.

Dirt from both track and wheel-type equipment was placed in the fills in layers from 4 to 8 inches deep, and rolled by sheepfoots to produce a 95 per cent density. The dumped lifts from the wheel-type equipment required somewhat more leveling and blading to make them uniform. Two Caterpillar No. 12 motor graders helped the dozers with this leveling and kept the haul

roads smooth.

Dragline loading was done always from the top of the cut, taking the entire bank depth in one pass. Both draglines worked in such a way that the hauling units could drive through on a good road without any reverse maneuvering.

On-the-Spot Maintenance

McCarthy-Pohl used a small, portable service shop to furnish on-the-spot maintenance with each equipment spread. Mounted on trailers, these small shops carried a stock of the parts most likely to need replacement. The "paper work", or records, for each piece of equipment, was also here. A small office and desk in each shop trailer made paper work as easy as routine repair.

Routine maintenance, operating repairs, and the replacement of broken parts at once kept the machines on the line and rolling. A special crew of night grease monkeys was responsible for the routine lubrication, fueling, and other minor service. Daytime mechanics took care of any breakdowns. Even when the machines worked a double 8-hour shift in 1949, machines showed less than 5 per cent of lost time due to mechanical failure.

As the equipment spreads moved from one grading area to another, the portable shop trailers followed. More



C. & E. M. Photo
A shot of concrete forming on the airport drainage system.

often, they led the way.

Fast Drains Construction

Construction of reinforced-concrete catch basins and drain channels moved (Concluded on next page)

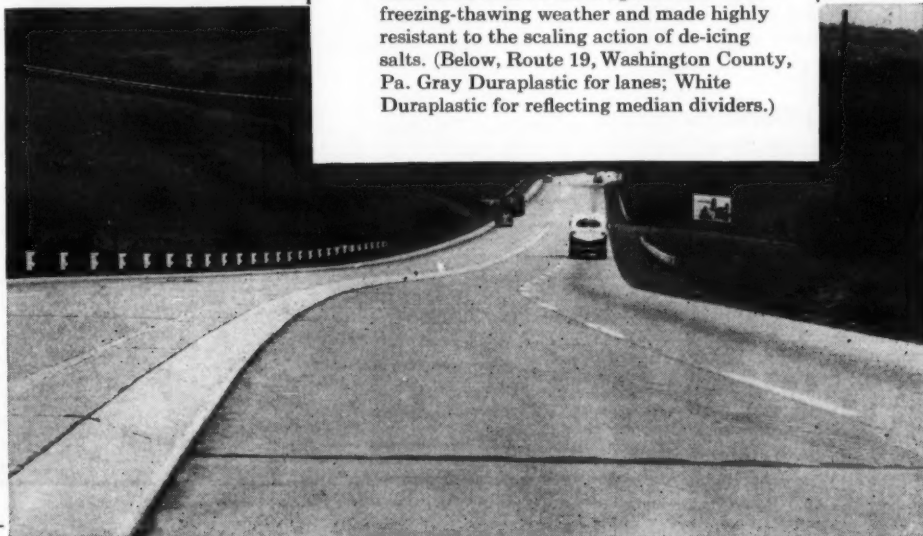


Better for paving work

Duraplastic air-entraining portland cement requires less mixing water for a given slump, makes concrete more workable, more plastic, more cohesive, more uniform. The mix dumps, spreads, screeds and finishes easily; allows finishing closer to paver, earlier protection for curing.

Makes more durable concrete

Duraplastic air-entrained concrete minimizes bleeding and segregation. Finished concrete is thus fortified against effects of freezing-thawing weather and made highly resistant to the scaling action of de-icing salts. (Below, Route 19, Washington County, Pa. Gray Duraplastic for lanes; White Duraplastic for reflecting median dividers.)



YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

ATLAS

DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

Makes Better Concrete at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network



C. & E. M. Photo
A truck mixer dumps concrete into an airport drain form at Lambert Field. Tarlton Construction Co. subbed this work.

Airport Cut and Fill Mapped, Then Moved

(Continued from preceding page)

rapidly. Tarlton Construction Co. built several sets of prefabricated wood and steel forms with steel facing. The 20-foot panels were handled by a tractor and side boom, which set them in against a trench cut by a trenching machine.

The forms were spread to the proper internal width and checked for grade. They were anchored from floating by steel auger bits extending through top caps into the ground. Pours were quickly made by truck mixers, which hauled from a nearby commercial ready-mixed-concrete plant. A top baffle board split the concrete stream in two equal parts, and the load on each side form was the same during a pour.

Although drains construction could not be started until the grade had been established, the concrete crew was never slow to finish its work once a piece of ground had been turned over after grading.

Field work is under the supervision of O. W. Frizelle, General Superintendent, and E. C. Conway, his assistant. Richard Ashby and Steve Demming forms the engineering staff of McCarthy-Pohl.

Engineering Services

A new 51-page brochure describes the engineering and general services offered by Gannett Fleming Corddry & Carpenter, Inc., Engineers, of Harrisburg, Pa. It treats principally the operation and functions of the company's highway and bridge divisions, though some mention is made of other work

such as sewage-treatment plants, dams, waterworks, airports, and power plants. The firm's general services include valuation, accounting, construction, and management.

The brochure outlines the 35-year history of the firm and offers an experience rating of its key personnel. A large portion of the booklet is devoted to full-page photographs of highways,

streets, and bridges designed by the company. Text and photograph captions appear in both English and Spanish since the firm has done much work in Spanish-speaking countries.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 32.

Data on Foundation Piles

A new 16-page booklet designed to assist contractors and engineers in the evaluation of pressure-creosoted foundation piles for various types of construction projects has been issued by the Wood Preserving Division of Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa.

In reviewing the conditions under which wood foundation piles should be pressure-creosoted and the permanent qualities of the treatment, the booklet cites national, regional, and city construction codes which allow pressure-creosoted wood foundation piles for permanent construction. It describes

and pictures many examples of the use of pressure-creosoted foundation piles in the construction of commercial and office buildings, theaters and apartment houses, warehouses and industrial buildings, institutional and public buildings, housing projects, airports, and bridge and highway grade separations.

Copies of the booklet may be obtained by writing Koppers Company, Inc., Wood Preserving Division, or by using the Request Card at page 16. Circle No. 114.

New Clinton Plant, Men

The Clinton Machine Co. has tripled its engine-manufacturing capacity by the purchase of a plant in Maquoketa, Iowa. The plant has 120,000 square feet of floor space and excellent rail and trucking facilities.

In line with this expansion, Charles B. O'Neill was appointed Executive Vice President in Charge of Production, and Charles W. Hamilton was made Sales Manager.

A SIGN OF SPEED on Road Jobs...

FLOWE BROS. CONSTRUCTION CO.

AVERAGES 1000 YDS.

IN 10 HOURS



"It's the best shovel built" ... that's the way W. O. Flowe of Flowe Bros. Construction Co., Charlotte, N. C., sums up the high-speed performance of their new 3/4-yard Lorain TL-25 shovel. And they have pay dirt records to go by. Working in a mixture of clay and rock, the "TL-25" averages 1000 yds. per 10 hours—has hit a high of 1500 yds.—on a seven-mile, 200,000 cu. yd. road widening job near Shelby, N. C.

Owners who have checked this modern, new Lorain design—compared feature for feature—have decided, too, that it's "best built" in its class! Let your Thew-Lorain Distributor show you how this fast, powerful 3/4-yard class shovel can add speed to your jobs!

THE THEW SHOVEL CO.
LORAIN, OHIO

STOP!
SEE YOUR
THEW-LORAIN
DISTRIBUTOR

**Reasons why
LORAIN TL-25's ARE "BEST BUILT"
IN THE 3/4-YD. CLASS**

NEW DESIGN PRINCIPLE—"Interchangeable Packaged Components"—clutch shaft, engine, hoist shaft, cab, crawler propelling mechanism—may be removed and replaced as one unit.

INCREASED OUTPUT—it's packed with power and speed for fast, snappy performance—more working cycles per minute—more yardage per day.

"BUILT-IN" FEATURES—more values for your money: 5 identical clutches with interchangeable parts; one piece bed; oil-enclosed cut gears; anti-friction bearings; hook rollers; it's a "complete package"—no extras to buy!

7 MODELS TO CHOOSE FROM—3 crawler mountings to fit any travel or digging condition; 4 rubber-tire mountings in either single-engine (7 m.p.h.) Self-Propelled or two-engine (30 m.p.h.) Moto-Cranes.

BLADES For Snow and Ice Removal

FOR ALL MAKES AND
MODELS OF SNOW PLOWS

Made of specially developed
steel to withstand severe
service conditions.

Various widths, lengths, thick-
nesses—flat or curved—stand-
ard or special—punched ready
to fit your machine.

SHUNK SAW-TOOTH
ICE BLADE

Amazingly effective. Thor-
oughly breaks up and removes
heavy, slippery ice and snow
formations. Replaces all types
of snow plow blades or main-
tenance units. Write for Bulletin
and name of nearest
Distributor.



Shunk

MANUFACTURING
COMPANY

ESTABLISHED 1854
BUCYRUS, OHIO

THEW LORAIN

FIRST CLASS
Permit No. 280
(Sec. 34.9 P.L. & R.)
New York, N. Y.

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

2c-POSTAGE WILL BE PAID BY

Contractors and Engineers Monthly

470 FOURTH AVENUE

NEW YORK 16, NEW YORK

FIRST CLASS
Permit No. 280
(Sec. 34.9 P.L. & R.)
New York, N. Y.

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

2c-POSTAGE WILL BE PAID BY

Contractors and Engineers Monthly

470 FOURTH AVENUE

NEW YORK 16, NEW YORK

Contractors and Engineers Monthly - Request Card - Oct. '50

Please send me further information on the new products and also copies of catalogs described in this issue, as circled below.

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26	27	28	29	30	31	32	33	34	35	36	37	110	111	112	113	114	115	116	117	118	119	120	121	
38	39	40	41	42	43	44	45	46	47	48	49	122	123	124	125	126	127	128	129	130	131	132	133	
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*Company (or Government Body.) _____

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City _____ Zone _____ State _____

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Listing of your Business Connection is essential for handling literature request.

Contractors and Engineers Monthly - Request Card - Oct. '50

Please send me further information on the new products and also copies of catalogs described in this issue, as circled below.

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Listing of your Business Connection is essential for handling literature request.



What's the verdict, boys? It's the Tri-Line saw giving a demonstration of cutting contraction joints at Chicago's International Airport.

New Pavement Cutter Cuts 6½ Inches Deep

A new machine designed to cut or trim concrete, blacktop, granite, marble, or tile has been developed by the Tri-Line Co., 921-931 Carroll St., Racine, Wis. It features one-man operation, 3-wheel steerable design, direct-acting hydraulic control, and gasoline-engine drive. It is available with double-bonded diamond cutting blades in sizes of 10, 12, 14, and 18-inch diameter. These will cut depths ranging from 2½ to 6½ inches.

The Tri-Line concrete cutter has a 15-inch structural-steel welded frame and a tricycle undercarriage. It is powered by a 13-hp 2-cylinder 4-cycle air-cooled Wisconsin gasoline engine with positive governor control. Full hydraulic controls enable vertical raising or lowering of the cutter blade. The unit carries a 30-gallon-capacity water tank for jet-stream blade cooling. An adjustable pointer on a rigid-support wheel allows the operator to keep the machine on the line of cut.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 77.

One-Half-Inch Drill

The new Type 400 SpeedDrill, which has a ½-inch capacity, weighs 8¾ pounds, and delivers ½ hp at the drill point under normal load, has been announced by Speedway Mfg. Co., 1834 S. 52nd Ave., Cicero, Ill.

Aluminum die castings are used throughout. The drill is powered by a series-wound universal motor. A cast-in air-cooling system with oversize die-cast fan, cast-in baffles, and channels serves to cool the motor and clear away the chips from the working surface. Wide-faced alloy-steel cut gears run on shafts which are supported on both ends by antifriction bearings. The tool is equipped with a Jacobs geared chuck and a heavy 3-wire lead cord with ground jack.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 76.

Hydraulic Pumps, Cylinders

An 8-page catalog describing oil hydraulic pumps and cylinders for diversified application has been issued by The Commercial Shearing & Stamping Co., 1775 Logan Ave., Youngstown, Ohio. It covers the design of the units, their specifications, and features.

The hydraulic hand pumps are available in three types: an integral supply tank furnished in two capacities; a pump directly mounted on the tank; and a pump connected to a remote tank. These pumps can be mounted in any position and are furnished in four sizes for each type. The catalog mentions that special models are made to order.

Complete data are also offered on the commercial standard oil single-acting cylinders. These are available in sizes from 1 to 2½ inches and have a 10-inch stroke. Other products treated briefly

in the catalog are gear pumps and motors, valves, and multiple-sleeve telescopic cylinders. The folder suggests application of this equipment for snow plows, tractor attachments, front-end road-machinery attachments, dump bodies, winches, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 61.

Catalog on 34.7-Hp Grader

A new 20-page 2-color catalog presenting the Allis-Chalmers 34.7-hp Model D grader is offered by the Tractor Division of Allis-Chalmers, Milwaukee 1, Wis. Fifteen action pictures demonstrate the Model D's usefulness on an assortment of jobs. A 2-page photo points up the Model D's tandem rear-wheel drive, tubular-frame design, and rear-mounted engine transmission. There is a cutaway view of the 4-cylinder Allis-Chalmers gasoline engine, with a checklist of main performance features.

Other subjects discussed in the catalog include the Roll-Away moldboard, power control, and special attachments such as the Tractomotive rear-end loader, one-pass windrow eliminator, Baker V-type snowplow, and Allis-Chalmers scarifier. Many accessories

are also presented: horn, cab heater, windshield wiper, special moldboard equipment, radiator shutter, etc. One full page gives specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 52.

Aeroil WINTER CONSTRUCTION HEATERS

Prevent tie-ups, delays and costly shut downs!

- CONCRETE HEATERS
- THAWING TORCHES
- SALAMANDERS

AEROIL PRODUCTS COMPANY, INC.

75 Wesley Street

Also Chicago, San Francisco, Dallas, Seattle, Pittsburgh, Dedham (Mass.), Jacksonville, Los Angeles



for FASTER CONCRETE HANDLING

GAR-BRO Power-cart

HANDLES MORE THAN 3 CARTS!

TRAVELS 3 TIMES AS FAST!

NEVER TIRES!



HANDLE BIGGER LOADS faster with a GAR-BRO Power-Cart and save money. Here's power, speed and capacity to move 14 cu. ft. or 2000 lbs. of material up 20% grades or over rough, uneven ground at speeds up to 15 miles per hour. Turn within 4 ft. radius; practical on 5-ft. ramp or runway. Dumps the load fast with a trip-latch or pours slowly when controlled by the convenient tilt-brake on the concrete tray. Has all welded steel construction—no castings to break.

The GAR-BRO Power-Cart is available with concrete tray, box tray or platform—they are interchangeable. Get the facts now!

WRITE FOR CATALOG TODAY!

GAR-BRO Construction EQUIPMENT CATALOG NUMBER 71 B

Hoppers, portable and semi, (8 Models). Cap. from 2 to 4 cu. yds.

Wheelbarrows (25 Models) of all styles with wood or steel handles.

Concrete Carts (6 Models) cap. 6 to 8 cu. ft.

Shovel Barrows (2 Models) with fulcrum-type foot pedal to elevate and dump load.

Two-wheel Barrows (6 Models) of all styles.

Concrete Floor Hoppers (20 Models) cap. from ½ to 10 cu. yds.

Power-Cart handles 12 to 14 cu. ft. at 6 to 8 miles per hr. Turns in 4' radius.

Laydown Concrete Buckets (8 Models) for use with transit mixers. Cap. from 1 to 5 cu. yds.

Collection Hoppers (10 Models) with variety of discharges.

Transition Chutes of various types.

Heavy-duty Buckets (13 Models). Cap. from ¼ to 8 cu. yds.

Light-weight Buckets (4 Models). Cap. from ½ to 1 cu. yd.

GAR-BRO

MANUFACTURING COMPANY

2416 E. 16th ST., LOS ANGELES 21
DEALERS EVERYWHERE

Industrial Engines Are Interchangeable

A new line of portable industrial engines built around three basic sizes, a 4-cylinder and two 6-cylinders, has been introduced by Waukesha Motor Co., Waukesha, Wis. These three basic sizes are made as diesel, gasoline, butane, or natural-gas engines, and carry approximately the same output ratings, size for size, whether diesel or carbureted fuels are employed. They cover the 10 to 50-hp range.

The three natural-gas, butane, and gasoline power units, which are counterparts of the diesel power units and which have interchangeable mountings, may be supplied with either gas, gasoline, or combination gas-gasoline carburetors. Since they are high-compression overhead-valve engines, no change other than carburetor and timing adjustment is needed when switching from gas to gasoline operation. The identical mounting dimensions permit field change to whichever type of power plant uses the most easily obtained and most economical fuel in the job locality.

Cylinder blocks, cylinder sleeves, numerous bearings and bushings, valves and springs, gaskets, coolant pump, governor parts, and many other common service items are the same, size for size, and are interchangeable whether used for the diesels or the carburetor engines.

All power units of this series are available with or without fuel tanks, clutch and power takeoff, skids and slide rails. But in other respects all units will be built to a standard specification.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 46.

Heavy-Duty Truck Tire With Steel-Cord Casing

The Michelin Metallic Zig-Zag type, a heavy-duty 4-ply truck tire for highway application, is described in a new 4-page folder prepared by the Michelin Corp., 341 E. 62nd St., New York 21, N. Y. This tire, according to the circular, has an all-steel cord casing which gives a high load capacity, eliminates blowouts, and rapidly dissipates tire heat. The folder points out that the continuous flexing of tires on heavy vehicles may cause a temperature rise to 250 degrees F, and at this temperature the steel cord is 16 times as strong as textile.

The Michelin Metallic tire fits standard rims and uses tubes of corresponding sizes. It can be retreaded or recapped in a conventional manner with standard equipment.

The Y type, recommended by Michelin for off-the-road operation, has a carcass especially designed to withstand deep deflections and to resist wall bruises resulting from side impacts, rubs against posts, etc. Its heavier tread resists abrasion and wear on rocky or rutted road surfaces.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 35.

Literature on Lathes

A series of circulars describing and illustrating the line of Sidney lathes is available from The Sidney Machine Tool Co., Sidney, Ohio. These lathes are built in a variety of models in sizes from 14 to 32 inches inclusive. The circulars describe in detail the construction and mechanical features of the different types of lathes. Twelve-speed, 16-speed, and 32-speed models are offered. Complete specifications and detailed drawings are included in the folders.

This literature may be obtained from the company by indicating the type of lathe you are interested in. Or use the Request Card at page 16. Circle No. 12 and state your individual requirements.



A Huber heavy-duty grader makes the first cut and a Huber maintainer follows up on a Gilmer County highway in Georgia.

A Maintenance Team

Gilmer County, Ga., uses a Huber heavy-duty motor grader and a Huber maintainer as a team in maintaining the county's 1,000 miles of roads, of which some 50 miles are macadam-paved. The heavy-duty grader makes

the first cut and the maintainer follows through to smooth the work done by the larger unit. County roads are thus worked into good condition by one round of operation.

The maintainer digs diversion waterways by cutting through banks along the road with the bulldozer blade, and

the dozer attachment digs crossroad channels in which drainage tile is laid. B. C. Logan is chairman of Gilmer County's Board of Commissioners of Roads and Revenues.

Accidents don't happen; they are caused. Remember: safety always pays.

ONE Grease for ALL



**"Yes—One Grease,
One Gun and
A Better Job too!"**

Here is a versatile grease that can be used with absolute confidence wherever lubrication is needed—chassis, wheel bearings, water pumps, universal joints, etc., in winter or summer—under all kinds of operating conditions.

**These 4 Severe tests prove
SINCLAIR LITHOLINE
is better than any single grease!**

SCENE: Sinclair's Research Laboratories, Harvey, Ill.

CAST: Two commonly-used greases of highest quality; a calcium soap chassis lubricant and a sodium soap wheel bearing grease; and Sinclair's Litholine.



WATER RESISTANCE TEST!

Samples of each grease are heated in beakers of water. Near boiling, the sodium grease disintegrates into soapy water and oil. Shortly after boiling the calcium grease shows foamy emulsion as grease absorbs excess water. Litholine remains unaffected, proves its superiority in combating wet conditions.

SINCLAIR REFINING

Roadside Machines In Action in Conn.

A group interested in roadside development recently journeyed from neighboring New England states to Connecticut to see some of the roadside work there and, particularly, to view its seeding and mulching machines in action. The work being done was on U. S. Route 6A, in Hebron.

Connecticut's seeding machine has been in successful use for several years and has previously been described in these columns. The mulching machine, a more recent development, is the next step in the mechanization of this type of work. The basic unit of this machine is an American No. 450-E clockwise blower of the horizontal-discharge type, driven by a 6-cylinder gasoline engine through multiple V-belts. This assembly is mounted on an I-beam frame for easy loading and unloading onto or off a truck. The blower has a rated displacement capacity of 11,392 cubic feet of free air per minute or 11,420



Connecticut's mulch spreader picks up mulch material from a windrow, or another truck, and places it evenly and quickly on roadside slopes, at distances up to 50 feet.

pounds of hay mulch per hour.

To pick up the mulch material, an 8-foot length of 18-inch Spiratube

flexible tubing is attached to the blower inlet. Mulch material, which in Connecticut is generally roadside mowings

or hay (in long strands), is drawn up from a windrow on the edge of the highway—or directly from another truck—through the tubing and into the blower by the blower fans. At the outlet end is a nozzle consisting of two pieces of 18-inch galvanized sheet-metal pipe, with an overall length of 4 feet. These sections are connected by a swivel which enables the operator to control the direction of distribution. A deflector on the discharge end of the nozzle provides additional directional control.

Mulch can be placed for distances up to 50 feet with this machine. When a section has been completed, the blower picks up any of the material left or spilled on the pavement. The speed and evenness of distribution have increased the efficiency of mulching operations and appreciably lowered the cost.

Another interesting Connecticut activity was also inspected by the group. This is some experimental work on rates of seeding, to see if the amount of seed can be reduced while still securing speedy and satisfactory turf establishment. In the autumn of 1949 and last spring, test plots at several locations throughout the state were seeded at rates varying from 10 to 70 pounds per acre. For the larger amounts, the seeding machine was used, and the state's customary seeding practices were followed. The 10 and 20-pound rate was found to be too low for the machine to handle, and it was sown by hand.

All the plots inspected showed good growth, with an excellent heavy mat of well established turf on the 40-pound-rate plot. This is a reduction of 50 per cent from the seeding rate now being used in Connecticut. It is planned to continue the experiment this autumn, but the results secured thus far indicate that satisfactory turf may be established with Connecticut's standard seed mix on roadside slopes with considerably less seed than has been thought necessary in the past. Further experiments and research will be made, in the interest of economies in roadside seeding and erosion-control work.

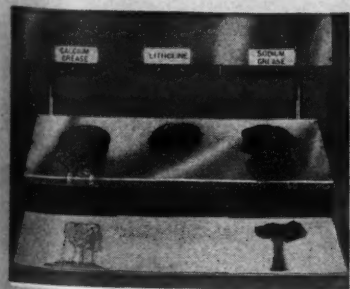
Several of Connecticut's many attractive picnic areas were visited, including the Seven Falls area on Route 9—the first picnic area on a state highway in the country. The group also drove over the Blue Star Memorial Highway (relocated U. S. 1) and inspected the memorial picnic area in the East Lyme section. Though not entirely completed, this roadside park is an excellent example of a natural beauty spot preserved and equipped with well-planned facilities and is being well used by the traveling public.

Lubrication Jobs!

LOOK WHAT ONE-GREASE—ONE-GUN LUBRICATION MEANS TO YOU...



- 1 Superior protective lubrication
- 2 No danger of misapplication
- 3 Less chance for contamination
- 4 Reduced time-out for lubrication and maintenance
- 5 Fewer servicing man-hours
- 6 Less wastage
- 7 Fewer dispensing units
- 8 Smaller grease inventories
- 9 Simplified purchasing and distribution
- 10 A finer grease at every lubrication point



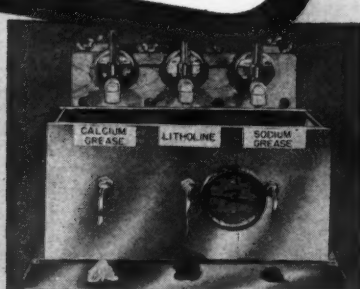
HEAT-RESISTANCE TEST!

The samples are heated on a plate. At 190°F., the calcium grease disintegrates. At 340-350°F., the sodium soap structure collapses and releases the oil. Bearing failures would follow. At 380°F., Litholine shows no effects, proves superior for high temperature lubrication jobs.



MECHANICAL STABILITY TEST!

Worked (kneaded) samples are placed beside samples of unworked grease. Steel balls are dropped. Distance ball sinks in worked samples shows increase in softness—loss of stability. The calcium grease showed greatest increase in penetration, the sodium grease next. Litholine showed no difference whatever... proving its superior mechanical stability in service.



LOW TEMPERATURE PUMPABILITY TEST!

Lever-type grease guns are filled with chassis greases and cooled. At 20°F., it is impossible to pump the sodium grease. At 0°F., it is impossible to pump the calcium grease. But Litholine still pumps in good volume! Yet Litholine is a heavier (harder) grease. Thus, Litholine has the body for summer service yet is pumpable in severely low temperatures.

COMPANY

For lubrication counsel, or more information on Litholine, see your nearest Supplier of Sinclair Products, or write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, New York.

Multicolored Pencils

Literature on multicolored pencils which offer a fingertip choice of three or four colors has been prepared by the Norma Pencil Corp., 137 W. 14th St., New York 11, N. Y. The color choice in the Norma pencil is red, black, blue, and green, or yellow may be substituted for any one of the colors, for users working on blueprints. The pencil is equipped with an eraser and reserve leads, and will take any standard lead. The literature describes other features of the pencil, the various models offered, and their cost.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 68.

Hyster Sales Appointments

Harold R. Lucas, Jr., is now assistant to the General Sales Manager of the Hyster Co., Portland, Oreg., and Henry Benit is in charge of demonstrations of the Hyster Grid Roller. Mr. Benit was formerly employed by the Gardner-Byrne Construction Co. and was instrumental in the original development of the Grid Roller by that company.

Woodruff Dam

Cofferdam Is Grouted

Admixtures Are Big Factor In Grout Curtain Mix for Sealing Off Water in Lock And Spillway Construction

By WILLIAM H. QUIRK,
Eastern Editor

grouting of a section under the dam and lock entirely from end to end of the dam will be required to prevent seepage under the dam.

Grout Curtain

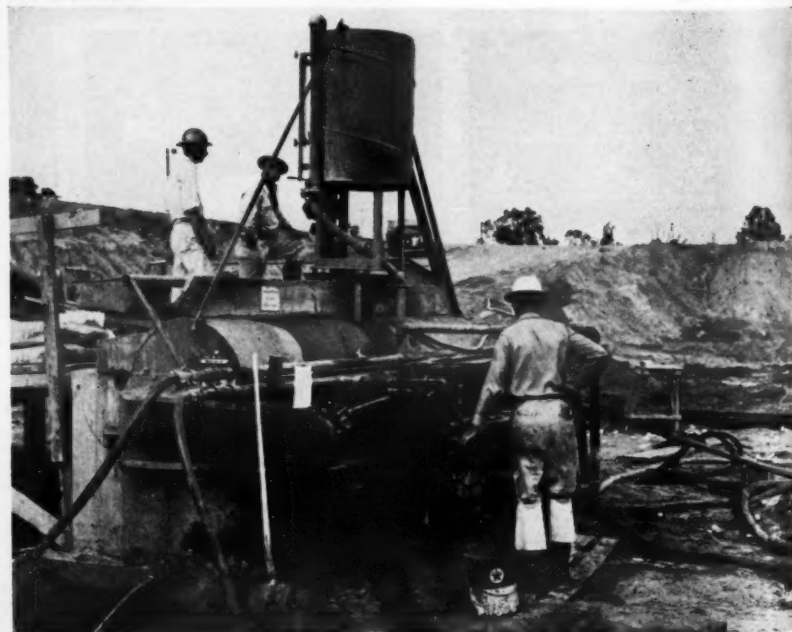
Provisions for this grouting were set up in the contract by the Corps of Engineers, but the details of the work were left to the contractor. The grout curtain was not intended to stop the flow of water entirely through the structures, but to limit it to a reasonable amount. Since the lock was scheduled to be constructed first, an experimental area 300 feet long was grout-enclosed, beginning at the north end and extending to the south. When this operation met with success, the grout curtain was extended to take in the entire lock together with the lower guide and guard walls.

Grout holes were drilled 20 feet from the outside of the neat face of the area to be excavated in rock, on 20-foot centers. Grouting was done in two and three stages, with the curtain extending from the top of rock down to a zone of relatively impervious rock. The intrusion sand grout used was composed of a mixture of portland cement, Alfesil, sand, and water, to which there was added an appropriate amount of Intrusion Aid. This mortar maintains the solids in suspension, flows easily without plugging, and develops in the voids a dense, strong paste tightly bonded to the rock—all of which are advantageous factors in grouting void spaces in rock.

Alfesil and Intrusion Aid are admixtures patented by the Concrete Chemicals Co. of Cleveland. Alfesil is a pozzolanic admixture consisting of fly-ash high in silica content. This finely divided siliceous material has a specific surface about twice that of normal portland cement, consists largely of spherical particles, has the property of combining with calcium hydroxide to contribute watertightness and long-continued gain in strength, and controls the initial setting time of the mix. Intrusion Aid reduces the water requirement for a given consistency, prevents the agglomeration of cement particles, tends to hold the solids in suspension, and produces a grout which expands slightly before final setting. Together Alfesil

(Continued on page 22)

C. & E. M. Photos



A Gardner-Denver pump sends grout through a 2-inch hose—the grout encloses the lock and spillway construction areas and seals off water.



You're looking west across the completed overflow dike section of Jim Woodruff Dam, which stretches out from the left bank of the Apalachicola River.



More trench wellpoint pumps empty into a sump at the south end of the lock excavation. From the sump the water was pumped downstream into the river.

In Third Year Lock Concrete Placed

Air-Cooled Aggregate Aids Smooth-Running Batch and Mixing Plant at Multipurpose Jim Woodruff Dam

(Photo on page 1)

ON the Apalachicola River in northwestern Florida at the Georgia line, one of the major contracts in the construction of Jim Woodruff Dam is under way. This multipurpose project of the Corps of Engineers, U. S. Army, Mobile District, includes navigation, hydroelectric power, and recreational facilities. Work on the dam started in 1947 and is scheduled for completion in 1954 at a cost of about \$43,000,000. The first contract covered the construction of a 2,530-foot earth overflow dike section of the dam extending out from the left bank. (See C. & E. M., October, 1948, pg. 63.)

The present work includes the construction of a lock and fixed-crest spillway, both of concrete, by Perini, Walsh, Mills, and Blythe Brothers Construction Cos. of Framingham, Mass., on a low-bid award of \$8,714,972.70. Work on this contract began in June, 1949, and is expected to be finished by October, 1951. The lock has a 33-foot lift and is 450 feet long x 82 feet wide; it is built in the flood plain adjacent to the right bank of the river at an angle of 83 degrees to the axis of the dam. The river wall of the lock is around 200 feet back from the right bank of the Apalachicola River.

The fixed-crest spillway, west of the lock, is 1,634 feet long and is of the gravity, ogee-crest type of overflow section. After these two major parts of the structure are built, there still remains a gated spillway section, 760 feet in length, and a powerhouse, 267 feet long x 151½ feet wide, to be constructed

under future contracts. When completed the dam will total about 6,130 feet long with a maximum head of 33 feet. By backing up tributary rivers Chattahoochee and Flint, it will create a lake covering 37,500 acres with a shore line about 243 miles long.

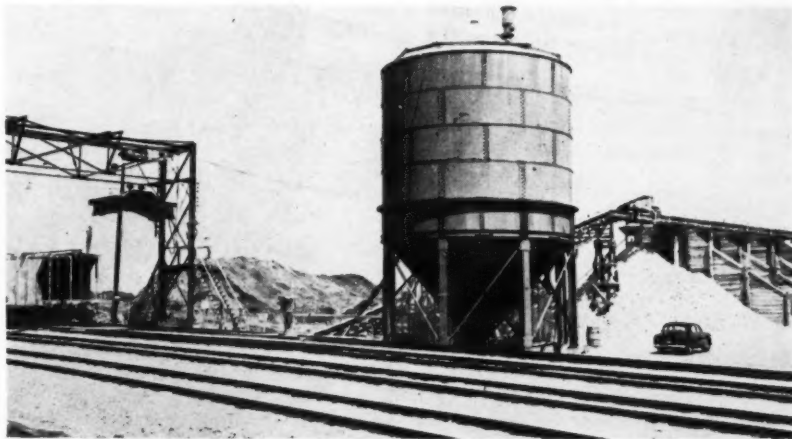
Lock Built First

At the start of operations, the contractor laid out his plant on the right bank of the river, and installed a siding for the job, from the main line of the Louisville & Nashville Railroad. The lock was undertaken first. A big hole was dug and the material removed and shaped to form a cofferdam around its perimeter. Further protection was accomplished with a curtain of grout going deep into the rock to measure 3,315 linear feet of work enclosed. A well-point system dewatered the overburden on top of the rock site. (See accompanying article.)

Excavation was handled chiefly by two big Page walking-type draglines which later did the concrete placing. (Continued on page 28)



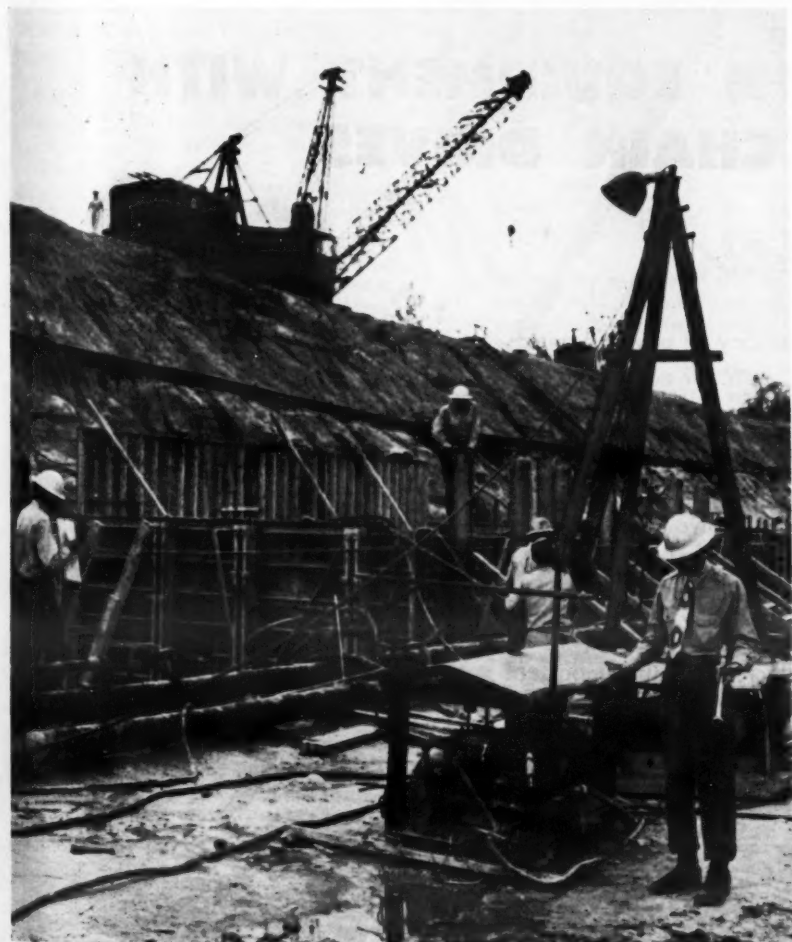
From the tower of the concrete-mixing plant, the aggregate conveyor and piles, and the Blaw-Knox 4,000-barrel cement silo at the railroad siding.



Near the silo, incidentally, is a Robins Car Shakeout (shown here at left on the framework above the tracks) which speeds unloading of hopper-bottom cars of aggregate.



In the plant, concrete batches are mixed in a Koehring 4-yard tilt-type mixer.



A Hydro-Silica pump supplies powerful jet spray to clean up the lock foundation before concrete placement. That is a Page dragline in the background.



Blaw-Knox cantilever forms were used in the lock, with 2-inch T & G lagging 6 feet high, backed by double 8-inch steel channels on 4-foot centers.

C. & E. M. Photos

Cofferdam Is Grouted For Jim Woodruff Dam

(Continued from page 20)

and Intrusion Aid eliminate settlement, plugging, bleeding, and setting shrinkage. By using them together, it was possible to pump at low pressure a mixture containing as much as 6 parts of sand to one part of portland cement to distances of 300 feet.

Under the terms of the contract, the contractor furnished the equipment, labor, materials, and supplies necessary for intrusion grouting at unit prices fixed by the Government while the Government paid all royalties on the patented admixtures.

Drilling

Grout holes, 2½ inches in diameter, were drilled with Carboly and diamond bits on a rotary-type drill after a 6-inch-ID casing or hole puncher was jetted through the overburden to the top of rock. A churn drill was employed through the hole puncher to drill from 2 to 3 feet into the rock so as to effect a seal and prevent the grout from blowing back through the overburden. When completed, a typical hole averaged 60 feet in depth—20 feet through overburden and 40 feet into rock. At the lock site the top of rock varied from 25 to 40 feet above mean sea level. Casings were pulled when the grouting was completed at a hole, and used over again.

In a two-stage grouting operation, the usual procedure was to drill 15 to 20 feet into rock, and grout. If circulation was lost or a cavity encountered during penetration of the rock, the stage was bottomed at that depth. The grout found an outlet in practically all the holes.

Mixing the Grout

The contractor made his own grout plant, a portable unit consisting of two mixers mounted in tandem on skids. Each mixer is 6 feet long x 3 feet in diameter, with a paddle wheel for agitating the mix which is driven by a Gardner-Denver air motor. A 15-cubic-foot batch of grout is mixed in each half of the machine. Materials are dumped into the mixing drums through an 18-inch slot, a ramp and platform providing access for the wheelbarrows used in charging the mixers. The grout is pumped through a 2-inch hose by a Gardner-Denver duplex air pump. Compressed air is supplied from a central plant. Grouting pressures varied from 0 to 20 pounds for first-stage grouting and 40 to 60 pounds for the succeeding stages.

Bag cement for the grout was supplied by the Ideal Cement Co. of Mobile, Ala., while the sand from various sources conformed to the following average gradation:

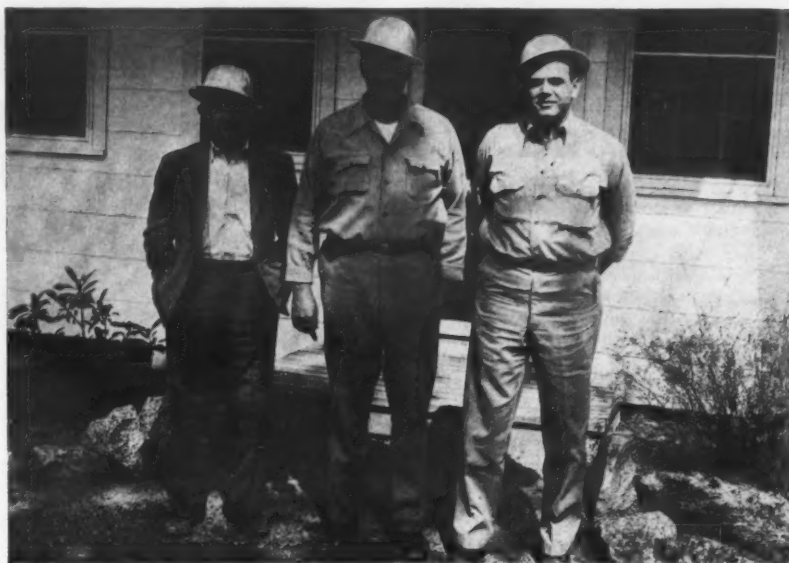
DIG HOLES FAST



The Danuser Digger digs holes fast, straight and automatic—500 to 600 per day. Easily fitted to most popular tractor makes—built for rough rugged jobs. One man operation; augers 4" to 24". Write Dept. D.

DANUSER MACHINE CO. Felton, Mo.

Also Manufacturers of the Famous Danuser All-Purpose Blade



C. & E. M. Photo

Personnel on the dam contract, left to right—Resident Engineer Thomas L. Hightower, Project Manager Albert Berry, and Office Engineer Harry Evans.

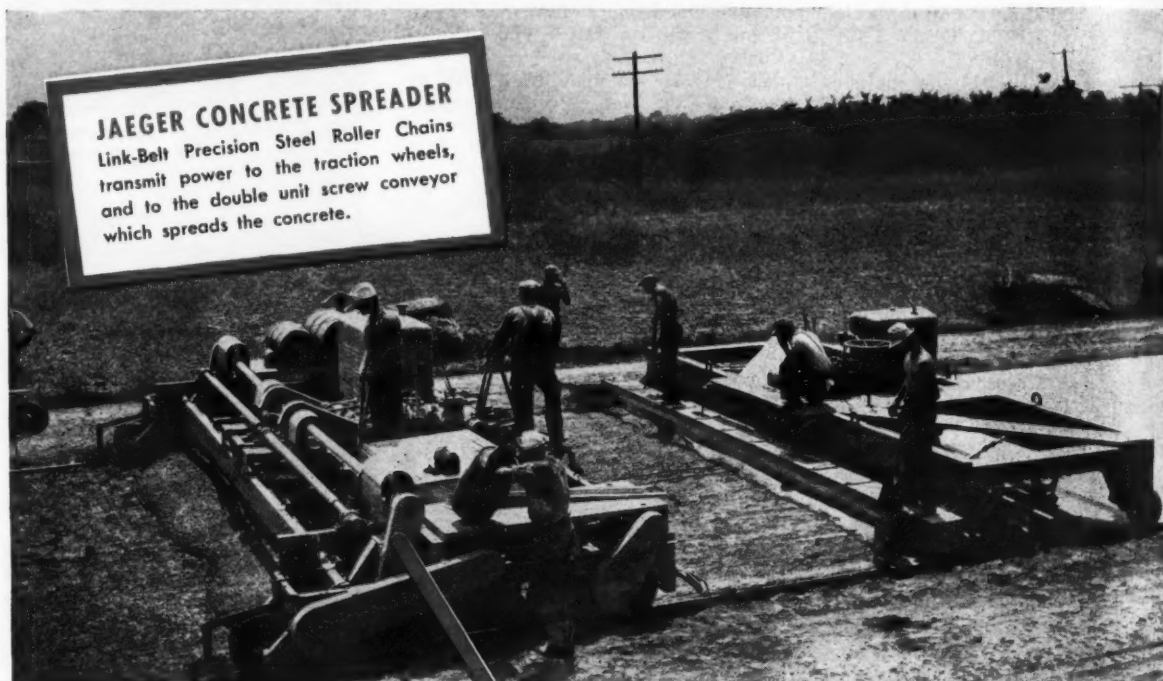
Sieve Size	Per Cent Passing
No. 8	99.4
No. 16	99.1
No. 100	11.7
No. 200	3.0

Various mixes were used, with the sand being the variable quantity; parts of 4, 6, 8, 10, and 12 to two parts of cementitious materials were the proportions generally employed. In all mixes the one sack of portland cement at 94 pounds and one sack of Alfesil at 75 pounds were constant. Water, sand, and Intrusion Aid varied as follows:

	4-Part	6-Part	8-Part	10-Part	12-Part
Water (gallons)	16	22	28	36	48
Sand (pounds)	326	490	653	816	980
Intrusion Aid (pounds)	2¼	2¼	5	5	5

Unit prices on items relative to the unwatering program were fixed in the contract by the Government at very near their cost. The price paid was 1 cent per 1,000 gallons of water pumped; \$1.10 per linear foot of 1½-inch grout hole drilled; \$1.45 per sack of cement; 68 cents per cubic foot of sand used in grout; \$1.35 per cubic foot of Alfesil in grout; and 18 cents per pound of Intrusion Aid.

(Concluded on next page, col. 2)



JAEGER CONCRETE SPREADER

Link-Belt Precision Steel Roller Chains transmit power to the traction wheels, and to the double unit screw conveyor which spreads the concrete.

CONSTRUCTION EQUIPMENT WITH LINK-BELT CHAIN DRIVES

Keeps Moving

Mass production, the order of the day on paving projects as it is in manufacturing plants, calls for equipment that works to capacity, without fail! Power transmission components must be efficient in performance to get all possible results out of every gallon of fuel. At the same time they must be rugged and durable, to give thoroughly dependable service. It's natural to find Link-Belt Precision Steel Roller Chains on representative makes of construction equipment, such as Jaeger paving spreaders and finishers. These chains are selected for the important function of keeping the moving parts moving!

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities. 12-018

The name Link-Belt on chain assures you of the highest quality in materials, the utmost precision of manufacture, the most efficient performance and longest life. Best results are obtained when Link-Belt chains run on Link-Belt sprockets.



LINK-BELT

Precision Steel

ROLLER CHAINS AND SPROCKETS



Lincoln Engg. Co. makes two heavy-duty lubricant pumps for emptying 400-pound refinery drums.

New Lubricant Pump Empties Large Drums

Two new heavy-duty drum pumps have been developed by Lincoln Engineering Co., 5702-34 Natural Bridge Ave., St. Louis 20, Mo. Model No. 1761 is for bung-opening drums; Model No. 1766 for full-open drums. Both are air-motor-operated.

Designed for fast, economic pumping of lubricants directly from 400-pound refinery drums, these units can be installed so as to deliver lubricant or materials through pipelines to conveniently placed outlets remote from the central source. If the entire output of the pump is required at one place, a hose assembly can be attached directly to the pump outlet.

Further information may be secured from the company by requesting Bulletin 631. Or use the Request Card at page 16. Circle No. 3.

Weather Forecasting With New Barometer

A new super-sensitive aneroid barometer has been developed by The American Paulin System, 1847 S. Flower St., Los Angeles, Calif. The unit is designed for on-the-spot determination of air-pressure conditions for weather forecasting. With etched graduations reading to 1/1,000 inch of mercury, and accurate to one graduation, the micro-barometer gives instantaneous readings without the necessity of corrections for temperature and latitude, the manufacturer says.

The company states that these new instruments are built around an exclusive system of instrumentation that represents a new principle in aneroid construction. The Model PMB-1 micro-barometer has a range extending from 24.80 inches to 31.00 inches of mercury. Other ranges are also available. The barometer is furnished with either a wall-mounting flange or a russet leather carrying case for portable use.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 125.

Flat-Bed-Trailer Design

A broadside detailing the design and construction features of the Great Dane flat-bed trailers is offered by The Steel Products Co., Inc., P. O. Box 1007, Savannah, Ga. A large photo illustrates the structural strength and balance of the truss design which is built into the Great Dane trailers.

The folder points out that the company has pioneered a frameless all-welded construction in both van and flat-bed trailers. Side rails of the flat-bed trailers are given a greater depth in the midsection, and, to provide additional strength with little additional weight, employ the open-truss design similar to that used in bridges. Other features are explained and illustrations of the various models are provided.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 64.

Cofferdam Is Grouted For Jim Woodruff Dam

(Continued from preceding page)

sion Aid used. The specifications required grout holes with a minimum 1 3/8-inch diameter, but permitted the contractor to employ the more easily drilled 2 1/2-inch-diameter hole. A total of 140 holes were drilled for the cofferdam enclosing the lock. One of the main items in the contract includes cofferdam protection and unwatering for the lock and fixed-crest spillway totaling 3,315 linear feet of work enclosed.

Wellpoint System

To lower the water table in the over-

burden, which naturally was not affected by the grouting in the rock below, a wellpoint system was installed along with the earth cofferdam that was thrown up around the hole with material taken from the excavation. A Moretrench system was installed using 4,000 linear feet of 10-inch header line in two stages. Half the footage went into the first stage, and the remainder in the second stage. Risers 24 feet long by 1 1/2 inches in diameter were used, spaced on 10-foot centers in the first stage and on 5-foot centers on the lower second stage. Pumping in the unwatering operations was handled by 8 Moretrench 8 x 10 pumps. They either pumped directly out of the hole or to a sump at the lower end of the lock. From the sump the water was pumped

out of the hole to flow downstream into the river. The hole for the lock at ground level measured about 1,200 feet long x 300 feet wide. The discharge water was measured on Sparling meters.

Work on the lock and spillway contract started in June, 1949, and is scheduled for completion in October 1951. The entire project will not be finished until 1954, according to present estimates, and will cost approximately \$43,000,000.

The Mobile District Corps of Engineers is supervising the Jim Woodruff Dam construction under the direction of Col. W. K. Wilson, Jr., District Engineer. Thomas L. Hightower is Resident Engineer. W. E. Webb is Head Geologist.



Summer, winter-
spring or fall
Marmon-Herrington
beats them all

● Look the world over and you'll find no more useful or versatile motor trucks than Marmon-Herrington All-Wheel-Drive Fords—nor any other multiple-drive trucks so attractively priced.

Words alone can't describe the amazing performance-ability of these great All-Wheel-Drive trucks. Only when you actually experience their tremendous, sure-footed lugging ability when the mud and sand are deep, the hills rough and steep—or their high-stepping speed when the roads are smooth and firm—can you believe it possible. Only then can you appreciate that here, indeed, are real all-year, all-purpose trucks—as useful and efficient off the highway as on.

There are 30 high-performing, high-speed models to choose from in the Marmon-Herrington All-Wheel-Drive Ford line—95, 100, 110 and 145 hp. engines—wheelbases from 110" to 220"—G.V.W. from 5,300 to 35,000 lbs.—from 4 to 10 forward speeds.

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Marmon-Herrington All-Wheel-Drive Fords are, for the most part, built of standard Ford Parts. Consequently, fast, efficient, low-cost maintenance and repair service is available at Ford dealers everywhere. When, occasionally, special parts are required, they are quickly obtainable through Marmon-Herrington distributors, conveniently located in principal cities the world over.

MARMON-HERRINGTON
All-Wheel-Drive

FORDS

County's Prisoners Help to Build Roads

Small, Selected Group of Men Maintain and Build Highways In Remote Sections Without Conflict to Contract System

↓ DOWN through the ages, notably from the time of Julius Caesar, prisoners have worked on roads. In the early days it was simple. Today, society is more complex, and perhaps the main problem wherever penologists and road builders try to get together is how to work the prisoners without jeopardizing the private contract system.

Los Angeles County, Calif., has found one way. Its officials say that it is satisfactory and has proved so over the years. Prisoners are given a chance to be rehabilitated in many of the wild, remote areas of the county which are not attractive to contractors. With a minimum of conflict between the private and public agencies, Los Angeles County is making an investment in human rehabilitation and new highway construction.

Both, from the standpoint of Los Angeles County, are worthwhile investments.

Camps Started in 1921

A pioneer camp was started prior to 1920, but the real start of Los Angeles County detention camps was made in 1921 under the then-famous Sheriff William I. "Bill" Traeger. Sheriff Traeger wanted some means of permitting certain prisoners to enjoy minimum security, and an occupational outlet for their rehabilitation.

From that humble beginning the camps have now grown to six in number, each with a capacity of about 60 prisoners. The camps are situated generally far back in the forest areas where county roads must somehow be built and maintained. They combine the solitude of the great outdoors with a tough job to be done.

The detention camps are strictly for minimum-security prisoners, or those who can be trusted to do their work without making attempts to escape. The percentage of escapes is small. Last year Detention Camp No. 5, for example, handled 200 prisoners and only six tried to escape.

Sheriff Eugene W. Biscauliz, currently in charge in Los Angeles County, has recently organized a classification board which screens prisoners by giving each man a personal interview. Those who meet the standards are given the chance to get out of the Los Angeles County jail, currently overcrowded nearly 100 per cent.

Generally speaking, the prisoners who are sent to the detention camps are charged with offenses punishable by imprisonment up to a year or more. Many of the prisoners are in jail for failure to provide for their children, and this type of prisoner is numerous in the road camps.

Prisoners arrive in the detention camps in prison garb but usually wearing their own shirts and shoes. These are cleaned and stored away. Each man is issued two work suits of blue denim, shirts, shoes, and a work jacket. Blankets and bedding are also issued.

Each prisoner is given a short interview. He is told where camp limits are located, and he furnishes information on his history and vocational preference. Prisoners are paid for the road work they do. The "failure to provide" cases get \$1 per day for one child, and \$2 per day for more than one child whose welfare depends on the prisoner. There are \$20 and \$40 monthly limits, respectively, on these cases. Other prisoners receive 50 cents per day.

Working conditions are good, and there is in evidence a high degree of morale. The prisoners get food that is well prepared. They work five days per week, have Saturdays off to clean their clothing, and have one day of rest on Sunday. Prisoners are encouraged to work at hobbies, and the manzanita roots and yucca wood in the vicinity make unusually attractive lamps and so on.

Roads Built and Maintained

Working with regular civil-service county employees, the prisoners maintain certain sections of highway and build new sections. While the setup makes use of labor insofar as possible, it does not remind one of the WPA. Rather, the program is designed to make



C. & E. M. Photo
Using a Thor pneumatic drill, a detention camp worker puts down holes for a Los Angeles County highway cut.

use of labor crews in those places where a private contractor, if he had the work, would also use men in a similar way.

Many of the sections where the camps

are located are mountainous and remote. Erosion of slopes is a constant problem. One of the best methods to hold embankments has been to riprap them with sacks of cement and sand. The mineral filler for this material is always native to the site, and it is mixed with the cement in a small mixer. Men fill the sacks and another crew places them. While the work is extremely hard, it is one of the most popular jobs around the camps, for the men can see the results of their work.

Part of the maintenance job consists of patrolling highways through the mountains where loose rocks roll down on the pavement. In wet weather this is a real maintenance problem, for it is not unusual for great quantities of dirt, rock, and boulders to slide in. The crews have to remove the material as fast as it comes down.

That job was done for years by labor gangs, but recently the highly maneuverable Wagnermobile was introduced. It is working out so successfully that other

(Concluded on next page)

TIME TO *when you buy*

Here is GMC Model 850, 35,000 lb. GVW powered with 200-H.P. gasoline engine with max. torque of 422 ft. lbs. at 1200 rpm. Built in wheelbases from 141 to 201 inches, this unit has air brakes as standard, and 5-speed Synchromesh transmission. Your GMC dealer will be glad to supply full specifications.



C. & E. M. Photo
A prisoner hand-scales a highway slope in Los Angeles County.

machines have been ordered. The machine has improved the efficiency of the gang enormously, with the result that a gang can patrol a much longer section

than was formerly the case.

Machine operators, engineers, foremen, and other key employees whose jobs require special skill are regular civil-service men. Prisoners with these men get the job done.

A great deal of new construction is also being done by the prisoners. One of the toughest and most spectacular projects is located in Malibu Canyon, where a new county road is being carved through an unbelievable wilderness area. In time, that road will connect Pacific Coast Highway (101-Alternate) above Malibu with the newer inland route U. S. 101.

The Malibu Canyon job exemplifies the thinking behind the use of prison labor, for if a job of this nature had to be let by contract, extensive and costly explorations and surveys would be necessary. The highway foundation is so tricky that the fills have had to be bolstered by metal walls. In many places wet spots have had to be excavated considerably deeper than was planned. The entire project has been a



C. & E. M. Photo
A Thew-Lorain shovel, working against a rocky mountainside near Angeles Crest Highway, helps prison group to push a new county route to completion.

succession of individual problems, which, coupled with the remote location, made it applicable in a peculiarly favorable way to prison labor.

Detention Camps No. 2 and No. 5, situated on the ends of a 12-mile job above Sunland, Calif., are building a

similar connecting link between State Highways 118 and 2. The road follows Big Tujunga Wash generally, and when completed will be 32 feet wide, with easy curves and a 7 per cent maximum grade. From gutter to gutter the roadway will be 32 feet.

Gangs from both camps are working toward each other, and will meet about halfway. This job calls for approximately 2,500,000 cubic yards of excavation, mostly in rock. It is a truck-shovel job, with pneumatic hand-held drills and conventional use of powder. One of the unusual features is the use of a new machine—a Hyster rear-end shovel and backhoe mounted on a D8 Caterpillar tractor—to pioneer in and dig the trenches for many feet of corrugated-metal culvert pipe being used to carry water through some of the fills. This machine also has a bulldozer blade so it can dig into any location and do its trenching work when it gets there.

Camps Not Growing

Los Angeles County road officials emphasize the fact that the work of the prison camps is being held to a minimum consistent with the purpose of the setup, and that the camps are not being expanded.

"We believe in the private, competitive contract system wholeheartedly, and it is not our purpose to go beyond the bounds which would jeopardize that system in any way," explained J. A. Blickensderfer, District Engineer in charge of road work by the detention camps.

Excellent cooperation is practiced between the road men and the sheriff's office, and the Los Angeles County method of solving a problem in sociology while getting new roads it might not get otherwise is, officials believe, a successful one.

ASTM Reissues Standards For Highway Materials

The American Society for Testing Materials has reissued its compilation of standards for mineral aggregates, concrete, and nonbituminous highway materials; pertinent specifications for cement are included.

This publication is intended for producers and consumers of these materials, specifications writers, testing and inspecting personnel, and research and engineering institutions. Copies of "ASTM Standards on Mineral Aggregates, Concrete, and Nonbituminous Highway Materials" may be obtained from the society, 1916 Race St., Philadelphia 3, Pa. The price is \$2.25.

SKF 11-State Sales Region

SKF Industries, Inc., Philadelphia, Pa., has established an 11-state western sales region with headquarters at San Francisco. The states of Washington, Oregon, California, Idaho, Utah, Wyoming, Montana, Colorado, Arizona, New Mexico, and western Nebraska and the city of El Paso, Texas, are in the new sales region. J. C. Bowman, District Manager at San Francisco since 1936, is Regional Manager.

LOOK AHEAD

heavy-duty trucks

Now more than ever dependability is extremely vital in heavy trucks and equipment. You want to *know* they will keep going—for years, if need be.

You get that kind of durability—through more years of use—in GMC's. It is this dependable operation, along with top performance at lowest transportation cost, that explains why more heavy truck users are buying GMC's now than ever before!

Built for Longer, Harder Work

These massive GMC's are designed and built to have added strength and long life in every part—especially important in the construction field. Check over the list of features that make every GMC outstanding for quality—unequaled by any other make.

Size and Power for Any Demand

There are husky giants for on- and off-the-road work, ranging up to 90,000 lbs. gross

weight as a tractor, and 55,000 lbs. gross weight as a truck. You have a choice of tough, lusty valve-in-head gasoline engines, or the famed GM 2-cycle Diesels, with power up to 200 H.P. The right wheelbase and gear combination is available to handle your job.

And Easy on the Driver

Men would rather work GMC's, with the "cushion-mounted," all-welded, "Six-Footer" Cab that stays comfortable. Clash-proof transmission and recirculating ball-bearing steering gear make GMC's the easiest trucks to handle.

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If you want a REAL truck—that will see you through—check with your GMC dealer. He'll be glad to show you how fully GMC covers the hauling field.

GMC Truck & Coach Division of General Motors

Only GMC's Bring You All These Features

GMC Heavy-Duty Valve-in-Head Gasoline Engines. Built to deliver top power and to last longer. All GMC gas engines, from 96 to 200 H.P., have TOCCO-hardened crankshafts and Moraine airplane-type bearings, top efficiency lubrication, cooling, and carburetion systems.

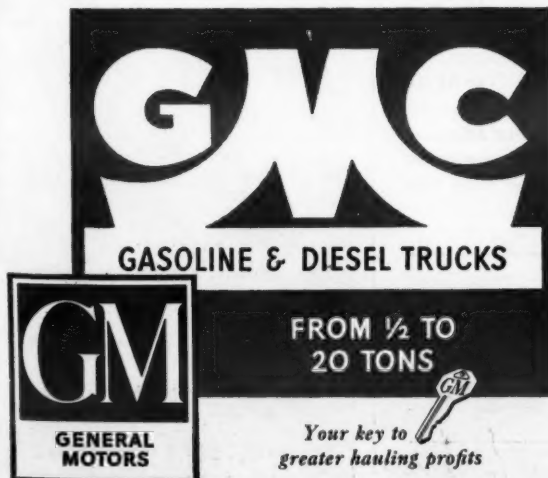
GM 2-Cycle Diesel. Exclusive Power-on-Every-Downstroke Design increases power and smoothness with reduced weight and bulk. Unit Injectors eliminate high-pressure fuel lines, pumps, and manifolds.

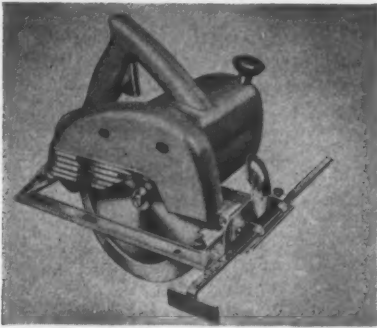
SYNCHRO-MESH 5-Speed Transmissions, for clash-proof shifting.

Recirculating BALL-BEARING Steering reduces driver effort and fatigue.

MASSIVE MODERN FRONT ENDS, with Frame-Mounted Bumper Stock Grilles. Radiator core is rubber-insulated, shielded in surrounding steel shell; fenders and grille separately removable.

ALL-WELDED, ONE-PIECE "SIX-FOOTER" CABS.
TRUCK-ENGINEERED FRAME—No Useless Dead Weight.





Maximum depth of cut for the Zephyr Model 625 hand saw is 2 1/4 inches.

Electric Hand Saw

A new portable electric hand saw, known as the Zephyr Model 625, has been introduced by Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill. Powered by a universal 115-120-volt fan-cooled motor, the new saw is able to cut from zero to 2 1/4 inches. It

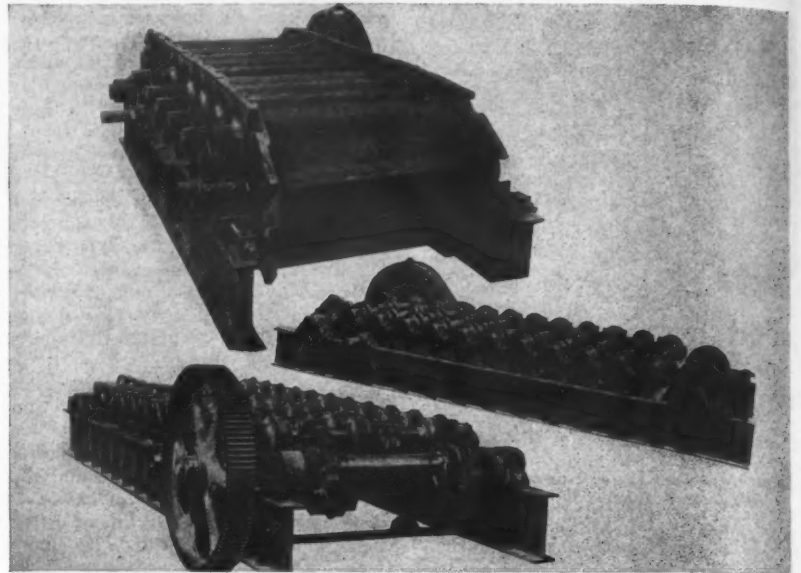
features angular cutting adjustment from 90 degrees to 45 degrees, an adjustable ripping guide graduated from zero to 8 inches, and a telescoping safety guard.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 2.

Long-Wear Bearing Surface Is Obtained by Metallizing

A bearing-surface material that outwears the old material as much as 25 times is described in a recent bulletin prepared by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City, N. Y. The 3-step metallizing process with Sprabond Wire provides a superhard oil-holding surface, according to the company. Bulletin 57B offers actual user reports and suggests several applications for the coating.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 19.



Feeder pans and all other wearing parts of the Pioneer-Oro Jumbo feeder are cast manganese steel. Drive links are cast integral with the pan.

New Primary Feeder

The Pioneer-Oro Jumbo feeder built by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn., is now available in a 72-inch width and in lengths up to 60 feet. Feeder pans and all other wearing parts, such as drive sprocket and supporting rollers, are cast manganese steel.

Patented features include interlocking support points on the pans proper, and cleanout wedges in the pans links to remove dirt on the return side. Drive links are cast integral with the pan to eliminate bolts and rivets. Pans are cast with upturned lugs at the ends to form an interlocking continuous lip to reduce spillage. These pans, which are corrugated and overlapping, are spaced at 15-inch pitch and are one inch thick at the smallest section.

Supporting the pans and load are three cast manganese-steel rollers keyed to heavy shafts, each shaft turning in three special-alloy bearings. These bearings rest on transverse I-beams, supported on deep longitudinal beams on which the head and tail-shafts are also mounted. Return idlers and a screw takeup are provided.

Further information on the Jumbo feeder may be secured from the company. Or use the Request Card at page 16. Circle No. 60.

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So states the plant engineer of the National Container Corporation of Jacksonville, Florida. In referring to the lubrication of their huge rotary kiln he said, "Since changing to LUBRIPLATE No. 8, wear on all bearings and journals has been reduced to a minimum."

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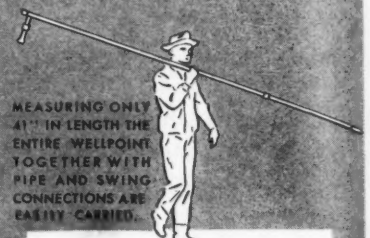
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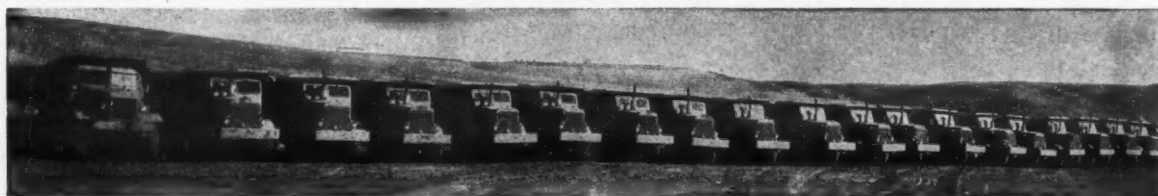
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at Randall Dam**

with

**KIM
Hotstart**

Winter temperatures in South Dakota do not encourage quick or easy starting of motorized equipment. So, Western Contracting Corporation, contractors on the Randall Dam job, installed KIM Hotstarts on their equipment. Here are the results:

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KIM Hotstart electric pre-heater on each gas or diesel engine is plugged into electric circuit when equipment is not in use. This draws off cold water, heats it, forces it back into the engine at another point, keeping engine warm and ready for instant starting. Battery life is lengthened; heated terminals or garages are not needed. Models to fit all trucks, tractors, automobiles, stationary engines. For installation see your International Harvester or Mack Truck dealer or other automotive suppliers; or mail the coupon for detailed information.

KIM Hotstart Manufacturing Co.

West 917 Broadway, Spokane 11, Washington

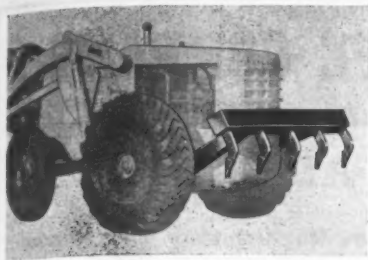
Please send literature, prices and name of local dealer.

Name _____

Address _____

City _____ Zone _____ State _____

Make and model of equipment _____



Present production of Kay-Brunner's new scarifier is for $\frac{3}{4}$ -yard Model HF Payloaders. Scarifiers for other Payloaders will be available soon.

Hydraulic Scarifier For a Wheel Tractor

A hydraulic scarifier for use on Hough Payloaders has been introduced by Kay-Brunner Steel Products, Inc., 2721 Elm St., Los Angeles 65, Calif. The packaged unit consists of scarifier, rams, control valve, and all fittings. Using the hydraulic system on the tractor, the scarifier unit is said to provide continuous full buckets for the front-end loader.

The ripper bar, which clears the Payloader hitch when raised, has five adjustable shanks with H & L removable teeth. Here are some specifications: ripping width, center to center of outside teeth, 70 inches; penetration, 8 inches; raised height, 21 inches; weight, 1,100 pounds. The unit can be installed in the field.

Present production of the Kay-Brunner scarifier is for the $\frac{3}{4}$ -yard Model HF Payloader. Scarifiers for other models will be available soon, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 23.

New Drawing Compass

The new Kern Circle Master, a compass designed for unusual flexibility, is now being marketed in this country by Borden & Riley Paper Co., Inc., 60 E. 11th St., New York 3, N. Y., exclusive importers of the line. The new drafting instrument incorporates all features of the Kern Master Bow compass along with a number of new ones.

Knee joints on the new model can be quickly and easily adjusted to the various sizes of the required circle without altering the setting of the center wheel. This design enables drawing as fine a circle as can be obtained with the traditional bow compasses, the company says. The pencil holder is the Kern Chuck which is adjustable to all sizes of lead, including commercial stationery and color leads. The Circle Master compass is available as a single unit or in complete sets.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 41.

Generators for Export

A new booklet describing the entire line of Onan electric-generating products available to the export market has been prepared by D. W. Onan & Sons, Inc., Minneapolis 14, Minn. Included in this 12-page folder is a list of suggestions for negotiating export documents, computing terms of payment, and establishing letters of credit. These sugges-

tions are the result of the company's experience in the export market and are expected to assist overseas importers in the preparation of such documents.

The Onan products described in the folder include electric-generating plants, both gasoline and diesel-powered; air-cooled 4-cycle engines; separate ball-bearing generators; and four water-cooled marine generating plants. A special section of the booklet describes Onan electric-plant accessories which include rubber-tired 2-wheel dollies, automatic controls, line-transfer controls, gas-gasoline carburetors, and heat exchangers.

This literature may be obtained by requesting Export Folder A-185-C, or by using the Request Card at page 16. Circle No. 96.

Snowplow for Truck

A new snowplow attachment for the White 3000 Model truck with dump body has been developed by Good



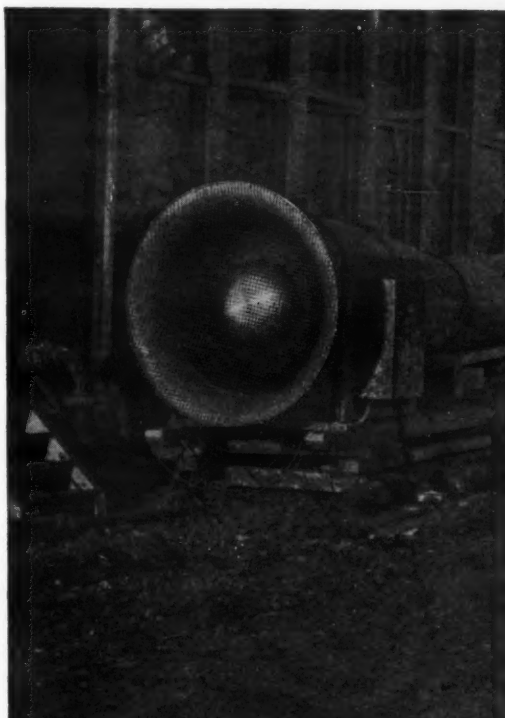
Good Roads makes this new snowplow attachment for the White 3000 truck with dump body.

Roads Machinery Co., Minerva, Ohio, working with White Motor Co. engineers. The plow blade and frame of the new unit are detachable. The hydraulic jack for raising and lowering the plow is easy to get at and is equipped with single detachable joints.

Proper weight distribution and short

wheelbase makes the White 3000 specially useful for winter road clearing, the company claims. The truck features a power-lift cab which affords complete front-end accessibility.

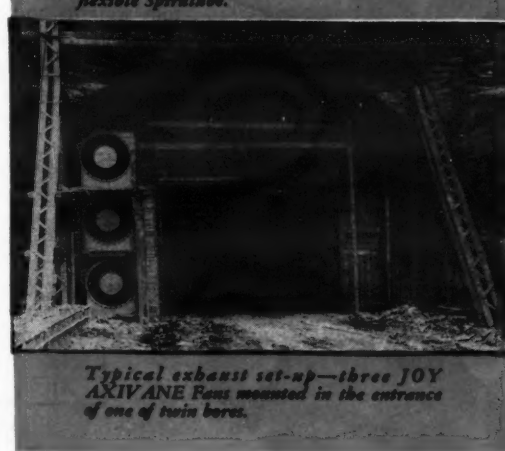
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 43.



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removal
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Lock Concrete Placed At Jim Woodruff Dam

(Continued from page 21)

One machine, a 621-S, has a 120-foot boom and a 7-yard bucket, while the other, a 620 model, has a 135-foot boom and a 6-yard bucket. They loaded out to 7 Sterling 10-yard dump trucks. At ground level the hole for the lock averages 1,200 feet long x 300 feet wide. The material excavated, along with some borrow, was used to form an earth cofferdam or dike surrounding the site as protection against high water. This was placed far enough back so as to allow a 70-foot-wide working berm around the hole. Other crane and shovel equipment on the job included a Bucyrus-Erie 54-B, a Lorain TL-20 truck crane, and three Northwest rigs—a 6, 25, and 80-D.

The sides of the excavation were cut to neat lines in the shale strata with the unique use of a Joy power saw, a tool employed generally in coal mining. The big saw worked on 2½-foot-gage tracks, cutting through all the limestone except the bed of hard dolomite limestone with slices 8 feet deep. It operated by air, as does most of the equipment and machinery in the contractor's plant. Current was supplied to the job by a 110,000-volt line from the Gulf States Power Co. Transformers stepped the voltage down for use in the lighting system and equipment operation.

A few elevations will throw some light on the vertical scope of the work. The river fluctuates from 46 to 80 elevation, with the bank or ground level averaging 58 (feet above mean sea level). The top of the lock walls are at elevation 82, with the foundation varying from 16 to 21 and for the lower gate and sill, down to 12.5. The fixed-crest spillway has a top elevation of 79; normal headwater in the pool will be at 77. The cofferdam around the site was built up to elevation 76.

Materials Handling

Materials for the 257,000 cubic yards of concrete in the contract came in by rail to the four-track plant siding that was laid out just south of U. S. 90 on the right or west bank of the river. Ideal bulk cement was shipped from Mobile, Ala. Natural sand was supplied by the Dixieland Sand & Gravel Co. of Phoenix City, Ala., while crushed limestone for the coarse aggregate came from the Alabama Aggregate Co. quarry near Pelham, Ala. Mass concrete in the structures is plain, but in the portions that are reinforced the steel was furnished by Truscon out of Birmingham, Ala. Water for the concrete is pumped from a well at the plant.

Bulk portland cement is stored in a Blaw-Knox 4,000-barrel bin adjoining the siding. From the cars it is unloaded into a trough beneath the track by an air-operated pump that pipes the cement either to the storage silo, the plant, or from silo to plant. A Fuller-Kinyon system of cement handling is used, complete with its own compressor and motor. The cement is blown through a 6-inch pipe that is hung to the framework of the aggregate conveyor leading to the plant.

Aggregate arrives in hopper-bottom cars which empty into an unloading tunnel beneath the tracks. On a framework above the tracks is a Robins Car Shakeout which is lowered and fastened to the top of the car to speed the unloading through a vigorous vibratory movement. Four sizes of coarse aggregate are used—6, 3, 1½, and ¾-inch. The sand and stone feed onto a Good-year 30-inch rayon-rubber belt which is carried on a Link-Belt conveyor system from the unloading tunnel under the tracks, up an 18-degree incline, to the top of the storage bins. This first movement is 188 feet 6 inches in length. The entire distance from siding track to

concrete plant is 659½ feet.

By Conveyor to Plant

The conveyor passes over timber bulkheads that separate the various sizes of aggregate. A traveling tripper on the belt permits unloading of each size of material into its respective section. Rock ladders from the conveyor to the bottom of the piles break the fall of the stone, and prevent cracking and shattering of the aggregate. The 3 to 6-inch-size bin holds 1,240 tons; 1½ to 3-inch holds 1,000 tons, as do the bins for the other two sizes of stone—¾ to 1½-inch and No. 4 to ¾-inch. Sand is contained in two bulkheaded compartments each containing 1,380 tons. These storage facilities were ample since supplies of aggregate were always delivered when needed.

Beneath the stockpiles is a 165-foot reclaiming tunnel built of Armco liners in the shape of a horseshoe—8 feet high x 7 feet 8 inches wide, and with a concrete floor. Gates in the tunnel roof (Continued on next page)

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Export Department: Chrysler Building, New York 17, N. Y.

Size Number	Cross-Sectional Area, sq. in.	Nominal Diameter, in.	Foot Weight, lbs.
3	0.11	0.375	.376
4	0.20	0.500	.668
5	0.31	0.625	1.043
6	0.44	0.750	1.502
7	0.60	0.875	2.044
8	0.79	1.000	2.670
9	1.00	1.128	3.400
10	1.27	1.270	4.303
11	1.56	1.410	5.313



Republic

CONCRETE REINFORCING BARS



feed the sand and stone, one size at a time, onto another 30-inch belt running through the tunnel. The belt emerges into the open and climbs another 18-degree incline on a Link-Belt conveyor that crosses U. S. 90 supported on steel towers. The conveyor belt over the stockpiles connects also with this last link going to the plant. A hinged chute at the junction permits by-passing of the storage bins, and directing the aggregate straight from car to plant. Conveyors and feeders are electrically operated by G-E motors. A hoist rig, cable, and sheave at ground level permit the movement of railroad cars at the siding.

At the top of the last conveyor the aggregate is unloaded into a Johnson batching and mixing plant with a 500-yard-capacity storage bin. The plant is equipped with an automatic batching and recording system, and has a maximum capacity of 160 cubic yards per hour. On a level below the bin are two Koehring 4-yard tilt-type mixers where batches are mixed for 2½ minutes.

Air-Cooled Aggregate

According to the specifications, concrete may not be placed when its temperature is over 65 degrees. In this deep southern latitude, water from the well used in the mixing averages about 70 degrees, and aggregate in the bins gets heated up to about 85 degrees. Thus with the heat of hydration from mixing with the cement, the concrete would obviously come out on the hot side. To meet the temperature requirements, a Tower system of concrete temperature control was installed. This system lowered the temperature of the coarse aggregate by blowing cold air through it in the bins, and also cooled the mixing water by refrigeration process. The necessary equipment was installed right at the mixing plant.

Such installation gave a bright, shiny appearance to the big tower, for the storage bin was enclosed with fiber glass and aluminum-foil insulation, as were the big air ducts that rise to the top of the plant. Beneath the insulation the ducts are corrugated-metal culvert-type pipe. Six ducts are grouped around the tower—four for intake to the bins and two for return, since a recirculating system of air is employed. At the bottom of the tower are two water-cooling tanks, one for the concrete-mixing water and the other containing water employed in spray-washing the cooling air. Three Westinghouse 100-hp Freon 12 refrigerating compressors cool the water in these tanks down to 34 degrees.

The air is cooled as it passes through refrigeration coils. It is then blown up the pipes and through the stone in the bin, lowering the temperature of the aggregate from an average of 85 down to 40 degrees. The recirculating of the air is a two-stage system in which the air is cleaned, dehydrated, and reduced



C. & E. M. Photo

Dorsey trailers pulled by Sterling trucks carry two Blaw-Knox concrete buckets each to Jim Woodruff Dam, near Chattahoochee, Florida.

in temperature from the approximate 75 degrees to which it rose after passing through the stone bin. In the first stage the temperature is lowered to about 38 degrees, and in the second stage the air is further chilled to a temperature of 33 to 28 degrees.

Cold-water sprays clean and cool the

air, and remove the dust which it picked up from the stone; in the process the air is also dehumidified. The system is equipped with American blowers, air washers, and dehumidifiers. This Tower cooling system was designed to cool materials for 100 yards of concrete per hour. The materials were cooled so

that the concrete when deposited in final place within the forms had temperatures below 65 degrees.

Also located at the mixing plant for more economical efficiency is the compressor house for supplying air to the construction area for the operation of the sump pumps, concrete cleaning, etc. Three Joy Model 13 stationary compressors, 8 x 7, supply air at 125 pounds of working pressure. Each machine is rated at 750 cfm at 800 rpm. The air is piped to the lock through about one mile of 8-inch Naylor Spiralweld steel pipe.

Concrete Batches

In the mass concrete 3¾-yard batches are used. At the mixers 250 cc of Darex air-entraining agent is added to each batch to produce an air content averaging 4½ per cent. Slump is 1½-inch average, with the mix proportioned at the rate of 3 sacks of cement to the yard. The saturated surface dry weights of a typical batch are:

(Concluded on next page)



NANTAHALA

NORTH CAROLINA

Postell Unaka

Hiwassee Old Apalachia

Hiwassee Ogreeta Old Apal

Bearpaw Ch Bethel Sch Brown

Reeds Chapel Shear Sch Shoal

LONG RIDGE

Hibbard Mountain

Burger Mtn Fowler B

Buck Top Deaden Top Do

Patterson Top Sandy Gap

HIWASSEE RIVER

PERSIMMON CREEK

Bearpaw Creek Beaverd

Shoal Creek Shuler Cree

Brush Creek Camp Creek J

Shoal Creek Shuler Creek

Anderson Creek Caney Branc

Beech Creek

APALACHIA APALACHIA DAM

HIWASSEE DAM JOE BROW

OLD FRIENDSHIP CEM QUAR

DUCKTOWN 10.5 MI. JUNC

84°17'30" 84°15' 84°1

420,000 FEET 430,000 FEET 44

560,000 FEET 570,000 FEET

64 65 66 67 68

84 85 86 87

252 253 254 255 256 257 258 259

260 261 262 263 264 265 266 267

268 269 270 271 272 273 274 275

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End Truck Units • Jib Crane Bins • Automatic Mechanical Load Brakes
Crane Hook Blocks

Lock Concrete Placed At Jim Woodruff Dam

(Continued from preceding page)

Cement	1,055 lbs.
Water	615 lbs.
Fine aggregate, sand	3,030 lbs.
¾-inch stone	2,079 lbs.
1½-inch stone	2,298 lbs.
3-inch stone	2,626 lbs.
6-inch stone	3,939 lbs.
Total	15,642 lbs.

The fine aggregates account for 22 per cent by weight. Total weight of the coarse aggregate is 10,942 pounds. The water-cement ratio by weight is 0.58.

The gradation of the natural sand is:

Sieve Size	Per Cent Passing
¾-inch	100
No. 4	95-100
No. 8	80-90
No. 16	55-75
No. 30	30-60
No. 50	12-30
No. 100	3-10

The gradation of the coarse aggregate follows:

Sieve Size	Per Cent Passing			
	No. 4 to ¾	¾ to 1½	1½ to 3	3 to 6
7-inch	.....	.....	.....	100
6-inch	.....	.....	.....	90-100
3-inch	.....	.....	90-100	0-15
2-inch	.....	.....	20-55	0-5
1½-inch	.....	90-100	0-10	.....
1-inch	.....	20-45	0-5	.....
¾-inch	99-100	0-10	.....	.....
¾-inch	30-55	0-5	.....	.....
No. 4	0-5	.....	.....	.....

Concrete Placing

From the plant the concrete in 3¾-yard batches was discharged into Blaw-Knox 4-yard bottom-dump concrete buckets which were set on Dorsey 35-ton trailers pulled by Sterling trucks. Each unit carried two full buckets with room for a third when returning to the plant. Four such truck and trailer combinations were used in hauling the concrete from plant to site, one mile away. The trucks made a big loop pulling under the plant and away again on the other side.

The two Page draglines handled the heavy buckets, which weighed 11 tons when carrying a batch. The buckets were opened after they were lowered into position by inserting an air hose and nozzle into a hole in the side of the bucket. As the concrete was placed it was vibrated with Jackson electrically operated internal vibrators. Blaw-Knox cantilever-type forms were used with 2-inch T&G lagging 6 feet high, backed by double 8-inch steel channels on 4-foot centers. The concrete was placed in monoliths 36 feet long x 40 feet wide at the base. For the first 10 feet of height, or up to the floor of the culvert that runs through each wall of the lock, the concrete was placed in 2½-foot lifts. Above that the concrete was placed in 5-foot lifts. The lock has a 1½-foot concrete slab floor with top at elevation 26. Grout pipes for future grouting when the lock is completed run through the culvert at 5-foot intervals.

In preparing a completed lift for the next placing of concrete, the surface is thoroughly cleaned and washed off by high-pressure hose. On this job a Hydro-Silica pump unit was introduced for this purpose. Its nozzles and spray jets at the end of a ½-inch hose sucked in 8 parts of air to 1 part of water passing through the hose, while the pump supplied pressure up to 1,000 pounds to the square inch through the hose. This removed all laitance and grout from the surface.

Curing was done with pipes spraying water over the surface and sides of a lift for 14 days. Forms were removed after 2, 5, or 10 days, depending on the location. The lock contains 30 monoliths, with 26 more in the guide and guard walls downstream of the lock. In a typical section the lock walls batter in until they are 10 feet wide on top.

Concrete placing in the fixed-crest spillway, which contains 45 monoliths, was expected to get under way in August. Concreting is carried on 16 hours a day in two shifts, on a 5-day-week basis.

In 1951, under a future contract, the river will be diverted slightly to the east to permit the construction of 12½ gates or bays in the controlled-spillway section. The following year, 1952, the river will be sent through the 12 completed gates so that the rest of the controlled-spillway section and the powerhouse may be built. The present contract contains a clause that permits the contractor on the controlled-spillway work, whoever that may be, to purchase the present concrete-mixing and batching plant at a nominal figure.

Quantities and Personnel

The major items in the contract for the construction of the lock and fixed-crest spillway are as follows:

Common excavation	357,000 cu. yds.
Rock excavation	129,500 cu. yds.
Line drilling	26,000 sq. ft.
Concrete	257,000 cu. yds.
Steel reinforcement	562,000 lbs.
Structural steel	229,000 lbs.
Wall armor, structural steel	436,000 lbs.

Perini, Walsh, Mills, and Blythe Brothers Construction Cos. employ an average force of 340 men on the project.

Contractor personnel include Albert Berry, Project Manager; Harry Evans, Office Engineer; Delano Cannon, Project Engineer; and Caesar Cuernoni, Project Superintendent.

For the Corps of Engineers, Thomas L. Hightower is Resident Engineer, assisted by Willard F. Simpson, James M. Polatty, and Capt. William C. Carter, Jr. The Mobile District, supervising the construction of Jim Woodruff Dam,

is headed by Col. W. K. Wilson, Jr., District Engineer.

Two Jeffrey Offices Move

The Jeffrey Mfg. Co. of Columbus, Ohio, has moved its West Virginia district office from Huntington to 403 City Ave., Beckley. The company's Cleveland office, formerly in the Rockefeller Bldg., is now in the Hanna Bldg.



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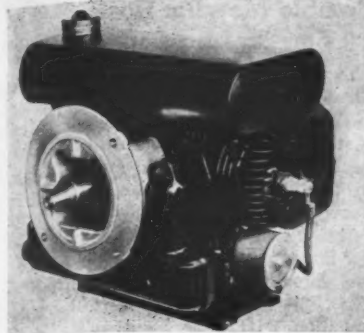
4700 W. Division St., Chicago 51, Illinois

Phone SP aulding 2-9300



HAILEY
NEW YORK, N. Y.

UNIVERSAL
CEDAR RAPIDS, IOWA.



Here is a Power Products Model 300 twin-cylinder engine equipped with the new adaptor flange which enables a quick change to electric motor.

Quick Power Change For Small Equipment

A new development which enables a quick switch from electric motor to gas engine, in the low horsepower range, has been announced by Power Products Corp. of Grafton, Wis. The new adaptor flange makes any of the Power Products engines interchangeable on a variety of equipment now powered by electric motors. Built to dimensional standards of the NEMA, the new adaptor flange will fit the mounting provided for direct-connected electric motors in frame sizes 43 through 49, and operating at 3,450 rpm. The Power Products engines are available in six models with a power range from 1 to 2 1/4 hp, in both horizontal and vertical-shaft types.

With this new adaptor flange, manufacturers of pumps, compressors, generators, blowers, and other equipment can offer customers the option of either gasoline or electric power units. Equipment users can switch quickly from electric motor to gasoline engine and back again, as conditions make one or the other more desirable. The flange is so ruggedly cast and constructed, says the company, that on horizontal applications the engine does not require its own base mounting, but may be direct-connected through the adaptor flange to the pump, compressor, blower, or other equipment which it powers. The adaptor flanges are made in two sizes suitable for either single or twin-cylinder engines, horizontal or vertical-shaft types.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 62.

Water-Repellent Compound Acts as Surface Preserver

Hydroban is described in a new 4-page folder issued by Hydroban, Inc., 15 Exchange Place, Jersey City 2, N. J., as a transparent, liquid, organic chemical compound for protecting and preserving most porous materials used for inside and outside building construction.

It describes the chemical reactive properties of Hydroban and its application for priming and drying wet plaster, preserving and hardening concrete floors and walls, priming and preserving wood, and as a preservative for paint.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 57.

ROETH



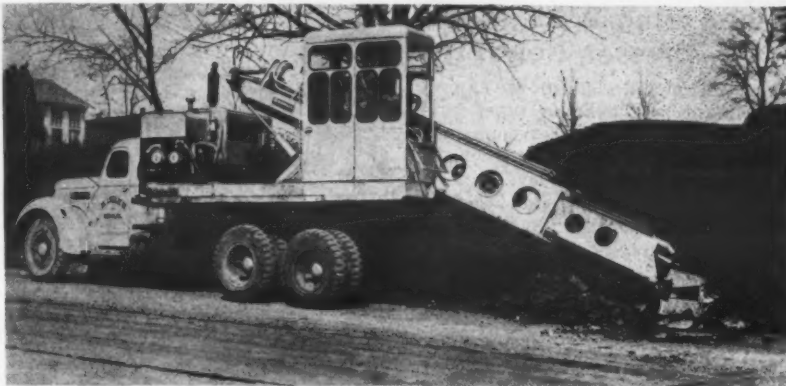
CONCRETE VIBRATORS MOUNTED ON WHEELBARROW CHASSIS Write for details and prices ROETH VIBRATOR CO. 1737 Farragut Ave. Chicago 40, Ill.

New Stripping Tool Removes Hose Cover

A tool for removing the outer cover from Aeroquip double and single-wire-braid hose—as is necessary prior to attaching the fittings—has been announced by Aeroquip Corp. of Jackson, Mich.

While the outer cover may be removed by hand, the hose-cover stripping tool is said to speed the operation. Each mandrel insures removal of only the amount of cover necessary for assembling the corresponding hose fitting, Aeroquip says.

Further information on this new tool may be secured from the company. Or use the Request Card at page 16. Circle No. 51.



At work on Route 422 near Sanatoga, Pa., this Gradall is excavating virtually solid red shale for a pipeline trench. After a spell of ripping, the operator changes to a bucket for truck-loading the excavated material. The machine is owned by the James J. Skelly Co., Media, Pa.

EUCLIDS

JOB PROVED FOR PRODUCTION AND PROFITS!

E

ngineered and built for heavy duty off-the-highway and industrial hauling, Euclids are job proved for high production at the lowest cost per ton or yard moved.

Owners prefer Euclid equipment for its efficiency and dependability under a wide range of operating conditions. Long service life combined with low operating and maintenance costs result in more profits and less down time. Operators prefer "Eucs" for their ease of handling, riding comfort, and positive control on soft fills and rough haul roads.

"Euclid is the best earth moving equipment we've ever used," say owners... "it does more work and costs less to own in the long run." Production records from hundreds of jobs prove that Euclids are the best for performance and profits.

The services of a Euclid specialist are available without cost or obligation. Call or write for an estimate on your present work or future jobs.

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio



NOW!

BUY used equipment

SELL used equipment

ACQUIRE competent personnel

thru The Trading Post

Contractors & Engineers Monthly

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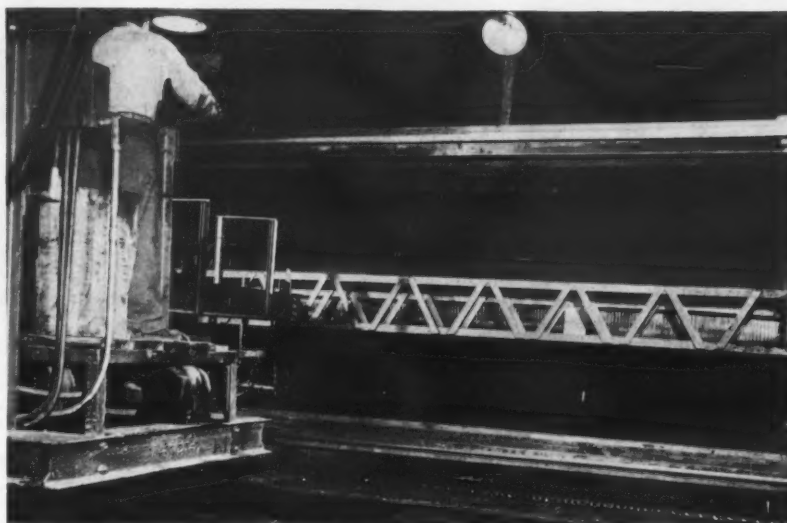
Steel Spring Wire Prestresses New Pipe

A special pipe design known as prestressed concrete cylinder pipe, built to withstand the pressures commonly encountered in the construction of water systems, has been developed by Lock Joint Pipe Co., P. O. Box 269, East Orange, N. J. Basically, the pipe consists of a substantial concrete lining inside a sheet-steel cylinder, with steel spring wire wound around the cylinder and an exterior coating of pre-mixed cement mortar. Standard sections are 16 feet long and are produced in diameters from 16 to 48 inches.

In manufacture, the concrete lining is either spun centrifugally or poured vertically inside the cylinder and allowed to cure. Steel spring wire is then wound helically under a uniformly high tension around the steel cylinder and anchored at both ends. Mortar hurled at high velocity against the cylinder forms a tightly adhering exterior coating.

The Jones & Laughlin wire used in the production of this pipe is high-carbon steel spring wire, either untempered or oil-tempered, with tensile limits between 192,000 and 210,000 psi. Tension winding puts a compressive stress in the cylinder and concrete core. When water pressure builds up inside the pipe, the compressive stress in the concrete is proportionately reduced, but even at normal working pressure some residual compression is retained in the core.

The considerable decrease in dead weight of prestressed pipe over conventionally reinforced concrete pipe, often as much as 35 per cent, creates direct savings in transportation and handling costs, the manufacturer points



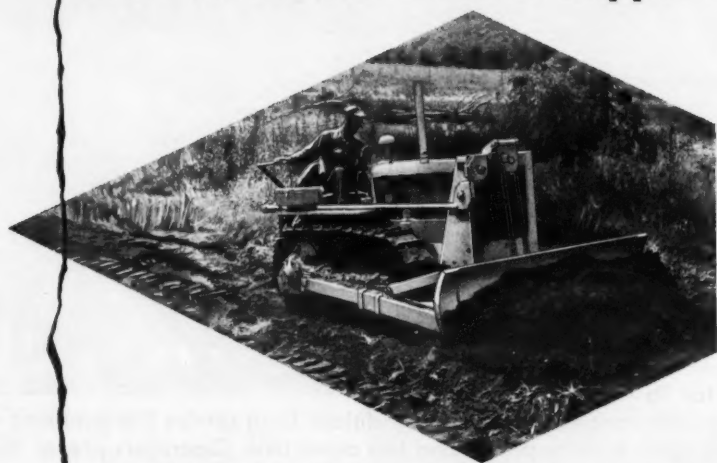
Jones & Laughlin oil-tempered spring wire wound helically under uniformly high tension around the outside of the steel cylinder puts the inside concrete core of Lock Joint prestressed concrete cylinder pipe in compression. This construction makes the pipe able to resist high bursting pressures, economizes on the use of steel, reduces the weight of the pipe, and gives it greater backload resistance.

out—especially where carloads of pipe are transported long distances from plants to the installation site. It also permits the use of lighter installation equipment and proportionate savings in time and fuel. The pipe's high resistance to external loads provides higher allowable beam and crushing loads. The highest pressure for which prestressed concrete cylinder pipe has been built to date is 300 psi, and the largest diameter is a 69-inch water supply line for Rio de Janeiro, Brazil.

Further information may be secured from the Lock Joint Pipe Co. Or use the Request Card at page 16. Circle No. 93.

KAY-BRUNNER

D-4 Cable Dozer featuring front-mounted sheave support



No Lifting Stresses on Radiator or Engine!

This mounting is for cable control operation of angling or straight blades on Caterpillar D-4 standard or wide gauge tractors.

As shown in the photo above, cable sheaves are mounted on a steel frame, which completely surrounds the radiator. This frame is supported by longitudinal steel members bracketed to the transmission case. There are no lifting stresses imposed on radiator or engine. Cable is led through a series of sheaves and along the side of the tractor to the power control unit at the rear.

This entirely new mounting eliminates obstructions above radiator level and gives the operator a clear view of the mold board. Caterpillar D-4's equipped with this mounting can be used for orchard work. Fenders can be installed without removing any part of the dozer. Write for prices.

KAY-BRUNNER STEEL PRODUCTS, Inc.
Equipment Division

2721 ELM STREET, LOS ANGELES 65, CALIF.

POWER CONTROL UNITS • LAND LEVELERS • DOZERS AND TRAIL BUILDERS • RIPPERS • CARRYING SCRAPERS • TAMPING ROLLERS • HYDRAULIC CONTROL SYSTEMS

Flexible Metallic Hose For Tar and Asphalt Work

Two new catalogs describe Penflex interlocked flexible metallic hose for tar and asphalt. These bulletins, prepared by the Pennsylvania Flexible Metallic Tubing Co., 72nd St. and Powers Lane, Philadelphia 42, Pa., describe the leak-proof, heatproof, and wearproof features of this hose. They point out that Penflex hose is specifically designed to resist constant flexing, abrasions, and heat. The hose is available in sizes up to 4 inches ID.

Bulletin 91 describes the features and application of this hose on tar and asphalt trucks, tar kettles, and tank unloaders. Bulletin 52-9 gives complete specifications and features of Penflex galvanized-steel hose and bronze steam hose. Complete specifications and illustrations of the hose in various services are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 79.

VIBER

A COMPLETE LINE OF CONCRETE VIBRATING EQUIPMENT

From the laboratory to the largest concrete dam, Viber versatility meets the varied requirements of all concrete construction.

For complete information Please write for illustrated brochure

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ADAPTER
MULTIPLE COUPLING
FULL DEPTH CONCRETE PAVING VIBRATOR

New Hospital Rises In Front of Old One

992 Cast-in-Place Piles Are Driven as Foundation for 7- Story RC Structure in Mobile, Alabama

A NEW Providence Hospital is under construction in Mobile, Ala., at the site of the original building. The greater portion of the new building, facing Springhill Avenue at the corner of Catherine Street, is being built in front of the old hospital. Part of the existing building will be razed to make room for the completion of the new structure.

The main wing of the existing hospital is a 4-story brick and stucco building. Replacing it is a larger and more modern 7-story and penthouse structure with a reinforced-concrete framework. One of the seven floors is below ground level; at the east end a deeper level goes down to form a basement floor for the boiler room. The new hospital has a long dimension of 249 feet 3 inches on the side facing Springhill Avenue, from which it is set back 95 feet. On the west, or Catherine Street side, it extends back 155 feet 6 inches, while on the opposite or east end the building is 132 feet 8 inches deep. At the rear the new hospital is cut out to form wings, thus providing greater light and ventilation than would an unbroken straight wall.

Providence Hospital is being constructed by the Ewin Engineering Corp., Engineers and General Contractors, of Mobile, Ala., according to plans drawn by Charles H. McCauley, Architect, of Birmingham, Ala. Work on the new building got under way in March, and is expected to be completed by the fall of 1951. The estimated cost of the structure is \$2,452,998.

Pile Foundation

The new building is supported on a foundation of 992 cast-in-place step-taper concrete piles, furnished and driven under a subcontract to the Raymond Concrete Pile Co. of New York City, with the Atlanta, Ga., branch office directing the work. Piles range in length from 30 to 48 feet with 10 1/4-inch diameter tips. Their diameter increases 1 inch for each 8 feet of pile, the butts averaging about 15 1/4 inches. The step-taper spirally reinforced steel shells were made up in 8-foot sections and shipped to the job site from Youngstown, Ohio.

After the sections were screwed together to form the lengths required, they were driven to the proper resistance in a deep stratum of sand so as to sustain a load of 30 tons per pile. Piles were driven with a steel mandrel encased in the shells which ran from 14 to 18-gage thickness. The Raymond oil-burning steam-driving rig had 75-foot steel leads and employed a Raymond No. 1 single-acting hammer. The driver advanced on heavy wooden rollers laid across steel H-beams which were supported on timber cribbing.

The piles were driven on an average spacing of 2 1/2 feet both ways in clusters

of from 2 to 30 piles to form a footing. The final driving took about 4 blows to the inch. Pile driving started March 17. The piles were closely spaced over the site, but despite the space limitations as many as 36 piles were driven in an 8-hour day. Raymond used a crew consisting of a foreman, operating engineer, fireman, and 5 pile-driving men under the direction of Henry LeMieux, Superintendent.

Concrete Footings

After the piles were driven the shells were burned off at the required grade and then filled with concrete having a compressive strength of 2,500 pounds per square inch at 28 days. The concrete was supplied by Radcliff Gravel

(Concluded on next page)



C. & E. M. Photo

A Raymond steam rig drives step-taper foundation piles for the new Providence Hospital in Mobile, Ala. It has 75-foot leads and employs a Raymond No. 1 single-acting hammer.

TERRATRAC

*Power
Versatility*

\$1580.00

F.O.B. OUR PLANT



HOISTS, bulldozers, winches, tampers, scrapers, graders, ditchers, levelers, earth movers, scoops, loaders, snow plows, posthole diggers, and mowers are but a few of the attachments which make TERRATRAC the most versatile industrial tractor on the market.

Foremost among TERRATRAC's many outstanding features . . . features that crawler tractor users have been WAITING FOR are (1) A sensational new ALL RUBBER TRACK that makes TERRATRAC the ideal highway crawler . . . replaceable at a lower cost than rubber tires. (2) Plenty of tracklaying power. (3) High clearance for straddle work. (4) Track gauges to fit all jobs. (5) Positive hydraulic control system for front and rear-mounted equipment.

STAMINA and DEPENDABILITY are built in . . . 4 cyl. Continental Red Seal Industrial Engine . . . Clark transmission . . . Borg-Warner gears . . . Spicer universal joints . . . Auto-Lite ignition . . . antifriction bearings throughout.

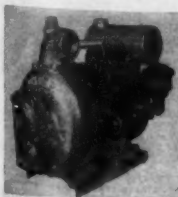
PRICEWISE the TERRATRAC has no competition. It undersells and outperforms. Our list price of only \$1580 F.O.B. our plant, less accessories and attachments, assures every TERRATRAC owner the best crawler buy today!

DELIVERY IS STILL PROMPT. Job-test a TERRATRAC now. Contact us for location of your nearest distributor.



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**TWIN
PRIME
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... Better
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DUAL VOLUTES, fast priming, non-clogging portable, long lasting centrifugal pumps.

Distributors—write for attractive proposition.

OHLER MACHINERY CO.
WATERLOO, IOWA



C. & E. M. Photo

A McKiernan-Terry 9B3 hammer is slipped over an ME-22 section of the sheet-piling wall along the sides of the hole bordering the old hospital.

New Hospital Rises In Front of Old One

(Continued from preceding page)

Co., Inc., of Mobile, delivery being made in truck mixers. The same company is furnishing transit-mix concrete for the construction of the entire building.

The piles extend 4 inches into concrete footings that are built around clusters of piles. These footings are of assorted sizes and shapes according to the design loading, and vary in thickness from 2 to 5 feet. The bulk of the excavation at the site was handled by a Link-Belt Speeder crawler crane equipped with a 35-foot boom and a

1/2-yard drag or clamshell bucket. Material consisted of a layer of clay at ground level overlying a stratum of sand.

Around the perimeter of the building is a 12 1/2-inch reinforced-concrete foundation wall poured in forms consisting of 1-inch T & G sheeting, and backed with 2 x 4 studs on 14-inch centers and double 2 x 4 wales. A Monarch Uni-Point table saw was set up on the site to speed the building of the form panels. Reinforcing steel for the building is supplied by Truscon Steel Co. The outside foundation wall goes down 12 feet below the first-floor level except in the boiler room area where the wall is 22 feet deep.

Sheet-Pile Wall

Before any excavation was done for the boiler room, a row of steel sheet piling first had to be driven around the sides of the present hospital at the east end of the site. This sheeting wall, consisting of MZ-22 sections 36 feet long, extends 130 feet along the sides of the hole bordering the existing building. The sheeting is but a foot away from one wing of the hospital, and 12 feet off the main building. The sheet-pile sections were driven to within a foot of the ground by a McKiernan-Terry 9B3 hammer handled by a Link-Belt Speeder truck crane equipped with a 60-foot boom. The hammer worked on compressed air supplied by Ingersoll-Rand and Gardner-Denver compressors.

First-floor elevation of the hospital is at 37.5, while the floor below that is at elevation 26.1. Still deeper is the boiler room with a finished-floor elevation of 16.13. The pits for the five elevators serving the building go down still deeper in this same general location to elevation 13. Since a stratum of water-bearing sand was encountered at elevation 20, a Moretrench wellpoint system was installed after the protective wall of sheeting was driven, and before the excavation in the boiler-room area had progressed to any degree. The wellpoint system consisted of two 8 x 6 pumps hooked to a 6-inch header line drawing from risers 20 feet in length.

With the wellpoints taking care of the ground water, the excavation was completed, and the walls and ground-floor slabs were poured. The boiler-room floor has a thickness of 12 inches, while the slabs for the other floors vary from 4 to 6 inches. Columns in the building average about 18 inches square at the bottom, with a few larger ones being 22 x 22; they decrease gradually in size toward the higher floors. Concrete in the building itself is designed for 3,000-pound strength.

Modern Structure

Steel pan forms are used for the joist and slab construction. Truck mixers deliver the concrete into buckets which are raised to the desired floor level on an outside material hoist. From floor hoppers the concrete is discharged into buggies which distribute it to the forms. The exterior of the building between the columns is closed in with brick curtain walls, 4 inches thick, backed by 8 inches of structural tile. The hospital

has a limestone front backed with greenstone facing. It is air-conditioned throughout. Other features include terrazzo floors and interior walls of ceramic tile.

Personnel included C. A. Root, Resident Engineer representing the architect, and Nolan West, who was Superintendent for the Ewin Engineering Corp. at the beginning of construction.

Automotive Shop Equipment

A condensed catalog on automotive shop equipment and service parts has been prepared by Lempco Products, Inc., 5490 Dunham Road, Bedford, Ohio. It illustrates each of the company's products, and gives complete specifications. Products listed in the catalog include brake and clutch equipment, wheel-balancing equipment, engine-rebuilding equipment, reaming and honing equipment, and accessories.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 9.



Keep 'em on the job!

USE EITHER

DIXIE CUPS
or **VORTEX CUPS**

Clean, fresh Dixie Cups, and cone-shaped Vortex Cups, help check the spread of colds and other mouthborne contagions. Reduce absenteeism!

DIXIE PORTABLE WATER CARRIER



Always on the job, crews don't leave their work. Insulation keeps water cool for hours. Ruggedly built for years of use! Cover and lining of stainless steel for cleanliness. Uses either

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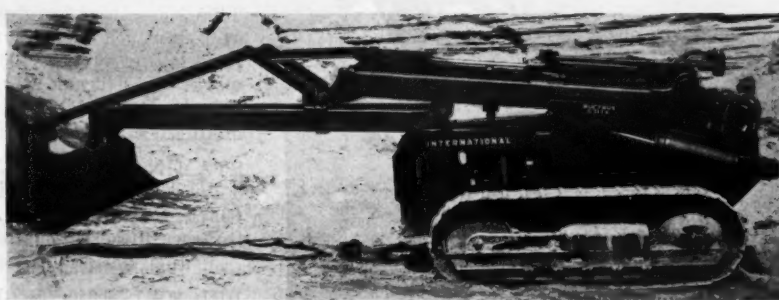
HEAVY-DUTY TRENCHER

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent, and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a 1/2-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will

dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for three



The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:
Allis-Chalmers HD-5G equipped with TS-5 Tractor-Shovel Caterpillar D-4 and Trackson HT-4
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel.
International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
Hough Model HM-Payloader

years, and has proved to be rugged and satisfactory in every way.

Immediate delivery can be made.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York

Phone: Utica 6-1117

Convention Calendar

October 15-18—Public Works Congress

The 1950 Public Works Congress and Annual Equipment Show, American Public Works Association, Hotel New Yorker, Ninth Regiment Armory, New York, N. Y. D. F. Herrick, Executive Director, 1313 E. 60th St., Chicago 37, Ill.

October 16-20—Safety Congress

National Safety Congress and Exposition, National Safety Council, Stevens Congress, Morrison, and LaSalle Hotels, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

October 24-26—Concrete Institute

Regional Meeting, American Concrete Institute, Mayflower Hotel, Washington, D. C. Harvey Whipple, Secretary-Treasurer, 18263 W. McNichols Road, Detroit 19, Mich.

November 3-4—NSPE Meeting

Fall Meeting, National Society of Professional Engineers, Little Rock, Ark. National Society of Professional Engineers, 1121 15th St., N.W., Washington 5, D.C.

November 14-16—Traffic Engg. Conference

Third Illinois Traffic Engineering Conference, Illini Union Bldg., University of Illinois, Urbana, Ill. Prof. R. K. Newton, 205 Arcade Bldg., Champaign, Ill.

December 4-7—AASHTO Meeting

Annual Meeting, American Association of State Highway Officials, McCallister and Columbus Hotels, Miami, Fla. Hal H. Hale, Executive Secretary, 917 National Press Bldg., Washington 4, D. C.

December 10-17—Pan American Highway Congress

Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 530 Washington Bldg., Washington 5, D. C.

January 3-5, 1951—Weed-Control Conference

Fifth Annual Meeting, Northeastern Weed Control Conference, Hotel New Yorker, New York, N. Y. Walter C. Jacob, Secretary-Treasurer, Long Island Vegetable Research Farm, Riverhead, N. Y.

January 9-12, 1951—Highway Research Board

Annual Meeting, Highway Research Board of the National Research Council, National Academy of Sciences Bldg., Washington, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

February 11-15, 1951—National Ready Mixed Concrete and National Sand & Gravel Associations

Twenty-First Annual Convention, National Ready Mixed Concrete Association, and Thirty-Fifth Annual Convention, National Sand & Gravel Association, The Roosevelt Hotel, New Orleans, La. V. P. Ahearn, Executive Secretary, 1325 E St., N. W., Washington 4, D. C.

March 12-14, 1951—ARBA Meeting

Annual Meeting, American Road Builders' Association, Shroeder Hotel, Milwaukee, Wis. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

Instruments for the Field

Two new illustrated folders on compasses and levels have been prepared by Leupold & Stevens Instruments, Inc., 4445 N. E. Glisan St., Portland 13, Ore. The first contains complete data, specifications, and prices on the Leupold Abney level, hand level, Cruiser compass, Forester compass, and Sportsman compass. It points out that Leupold levels feature an internal focusing adjustment which eliminates the need of refocusing each time the instrument is used. Also featured is a quick method of changing from one scale to another. The second folder describes the Leupold dumpy and builder's level with complete specifications and details.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 25.

Government Procurement

A United States Government procurement brochure, written and edited by procurement experts, has been released by Trilane Associates, Inc.

Free copies of the brochure may be obtained from Trilane Associates, Inc., 1 Hudson St., New York 13, N. Y.

AGC Works With State For New York Civil Defense

The Associated General Contractors of New York State has joined forces with the State Department of Public Works to marshal the state's home-front defense facilities. The two groups met in August to lay plans for effective use of equipment, materials, and manpower in the event of damage to state facilities by attack.

General Lucius D. Clay, Chairman of the New York State Civil Defense Commission, has charged the New York State Superintendent of Public Works, B. D. Tallamy, with responsibility for keeping highways, waterways, and other facilities in service. The six-man Civil Defense Committee of the State

Department of Public Works consists of key officials headed by Bernard A. Lefevre, Director of the Bureau of Research and Statistics. At the meeting, this committee with ten district engineers and their civil-defense assistants were the guests of the New York AGC, which was represented by a similar committee composed of its own members and associates.

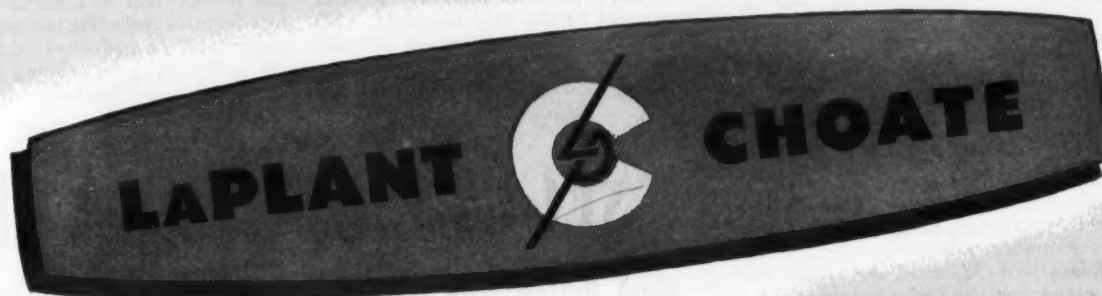
Perlite Plaster, Concrete Described in New Reports

Two new reports supplying basic information on perlite plaster and concrete have been prepared by the Perlite Institute, 35 W. 53rd St., New York 19, N. Y. The information includes mix proportions for plaster, k factors and

strength of concrete in several densities, and detailed fire-resistance ratings by standard ASTM methods.

The first of these folders points out that steel columns, girders, and beam and floor protection have received Underwriters' Laboratories ratings up to 4 hours for different thicknesses of perlite-gypsum plaster on metal lath. It also points to the savings in dead load which come from using lightweight aggregates. The second bulletin is general in content, outlining the properties of perlite plaster and concrete. It lists specifications and features, and gives data on the physical properties of perlite.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 63.



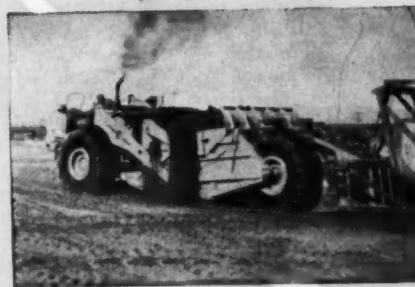
... the sure sign of more and more profitable earthmoving jobs!



LAPLANT CHOATE

One of the ways J. Robert Bazley uses Motor Scrapers for coal stripping at Mt. Carmel, Pa.

HERE'S the sure sign of the extra yardage production that gets the job done faster and at lower cost on more and more jobs. Watch LPC Motor Scrapers in action... talk to the men who own them. Then ask your LPC distributor to explain all the big-production, high-profit features. Laplant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa—Laplant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.



LAPLANT CHOATE

Brown Construction Co. is piling up high yardage totals at Denning, New Mexico.



LAPLANT CHOATE

Henry Deelger picks 4 Motor Scrapers to move 12 million yards of sand at Westlake, Calif.



LAPLANT CHOATE

Two LPC Motor Scrapers are working for Sawyer & Mingella on the Route 2 by-pass, Leominster, Mass.



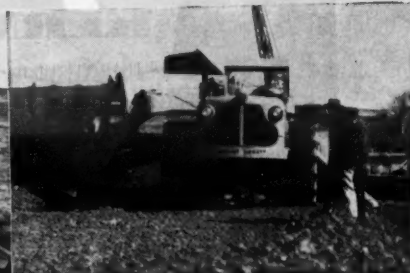
LAPLANT CHOATE

Four LPC Motor Scrapers are speeding operations on the Bonbrook Dam for I&T Clark, Ft. Worth, Texas.



LAPLANT CHOATE

For the Burlington Railroad relocation project at Chillicothe, Mo., Perry McGowan uses five Motor Scrapers.



LAPLANT CHOATE

Patterson Construction Company has three units working on the Pennsylvania Turnpike at Steelton, Pa.

LAPLANT CHOATE



LPC TW-300 Motor Wagon



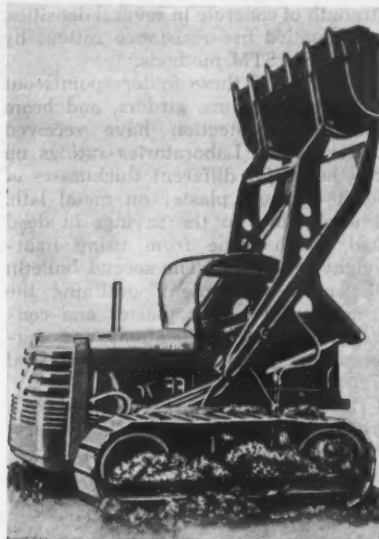
LPC Hydraulic or Cable Operated Dozers



LPC Rippers



LPC Tampers



A new 1-yard combination overhead-loading and front-end-loading shovel for International crawler tractors is made by Service Supply Corp.

Overhead, Front-End Loader for Tractors

A new 1-yard combination overhead-loading and front-end-loading shovel for International crawler tractors is now being made by Service Supply Corp., Philadelphia 32, Pa. By eliminating tractor turns, the Lodover is said to increase production and lengthen tractor life. Its low overhead clearance permits it to operate in restricted quarters in tunnels, on streets with heavy traffic, and under overhead obstructions, the manufacturer says.

A number of attachments are available for the Lodover. These include a hydraulic dozer blade mounted inside the tracks; hydraulic angle blade; lift fork for pallet and skid-loading attachment; rear-mounted winch; 10,000-pound-capacity crane boom; snow bucket; V-type snowplow; and a track-cleaning bucket for railroad work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 39.

Adjustable Steel Shores

"Speed, economy, and safety are provided by Acrow adjustable steel self-cleaning shores" according to a new 4-page circular prepared by Acrow, Inc., 420 Lexington Ave., New York 17, N. Y. Speed, it says, is provided by

simple one-man adjustment to any dimension within the working range of the shore. "Elimination of cutting, wedging, and nailing result in economy." Guaranteed strength and positive action with no possibility of slip give safety, the Acrow circular states. Along with information on the patented self-cleaning feature of the shore, the catalog presents complete specifications and illustrations of erection procedure. On-the-job photographs show Acrow shores in both vertical and horizontal supporting positions.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 17.

Scraper Is Improved

A more powerful 225-hp engine and larger 24.00 x 25 24-ply low-pressure tires have been adopted as standard equipment for the new Model TC-S142 Terra Cobra self-propelled scraper. Increased speed, gradeability, traction, flotation, and load-carrying capacity



A 225-hp diesel engine and 24-ply tires are standard on the new Wooldridge Terra Cobra to increase speed, gradeability, traction, flotation, and load-carrying capacity.

are claimed for it by the manufacturer, Wooldridge Mfg. Co., Sunnyvale, Calif.

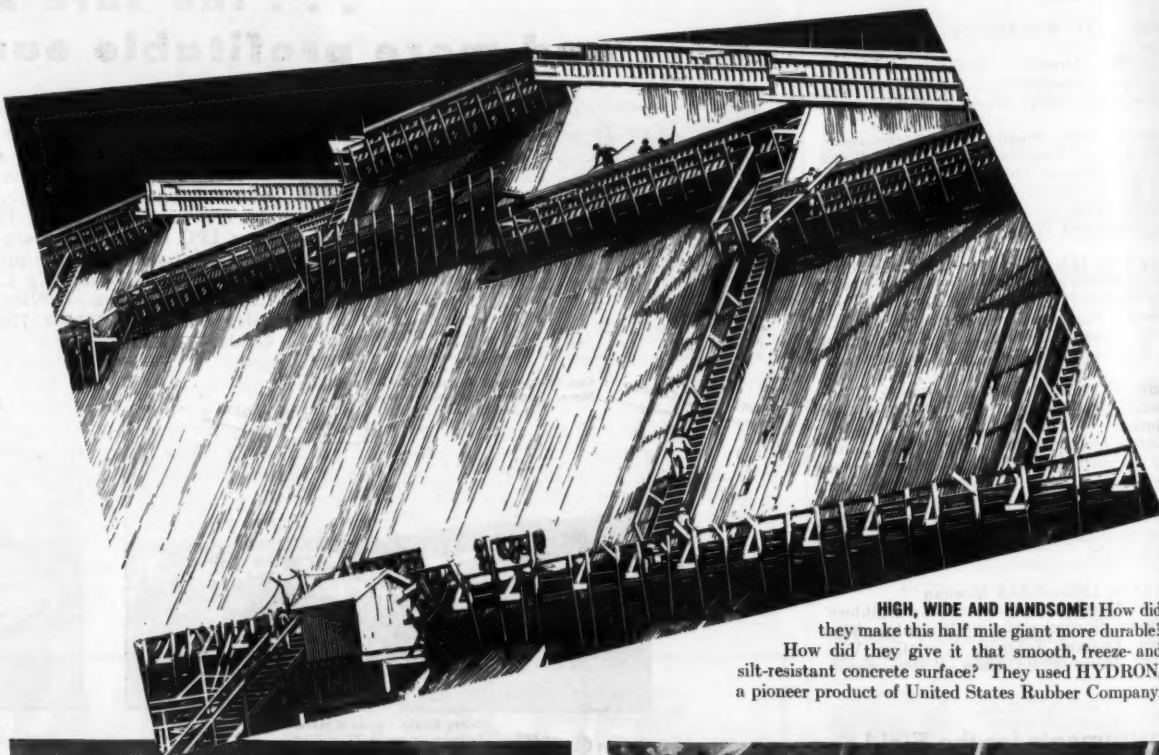
This announcement follows closely the introduction of a number of other new features including increased ground clearance, formed-steel construction, and a 65-inch apron opening and curved ejector designed for faster discharge of

sticky materials. Cummins Model HRBISD-600 225-hp 6-cylinder diesel engines are used in the new Terra Cobras.

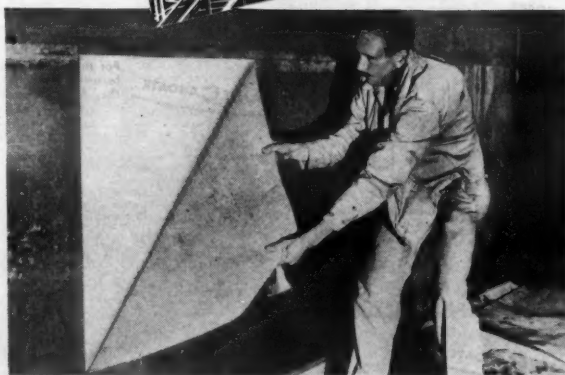
Further information may be secured from the company by requesting Bulletin TC-706. Or use the Request Card at page 16. Circle No. 44.

SECRET OF A GIANT'S STRENGTH

Giant Norfolk Dam built with Hydron Form Linings for stronger, pit-free concrete surfaces



HIGH, WIDE AND HANDSOME! How did they make this half mile giant more durable? How did they give it that smooth, freeze- and silt-resistant concrete surface? They used HYDRON, a pioneer product of United States Rubber Company.



LEARN THE SECRET of Hydron! It's a flexible absorptive form lining only 0.08 of an inch thick. It absorbs excess water and eliminates trapped air. Concrete laid against Hydron is smoother—lasts longer.



HOW IT'S DONE! Hydron is mounted to wooden forms by rapid fire staple guns; to metal frames, with special adhesive. Comes in a flat box, 4 x 6 ft. Easy to handle, easy to cut or trim for any giant job!

Engineers and contractors who have used Hydron Form Linings report that Hydron adds years to the serviceable life of concrete. Yet, the total cost, including a satisfactory profit, is only 12¢ to 16¢ per square foot. For more information write Mechanical Goods Division,

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BORDEN & RILEY PAPER COMPANY, INC.
60 East 11th Street New York 3, N. Y.

Mated Plants Make Hot-Mix Paving News

Twin Setup Floods Laydown Crews as 2,000 Tons Daily Move From Asphalt Plants To Highway Relocation

By **RAYMOND P. DAY**,
Western Editor

(Photo on page 1)

♦ THERE was a time, not long ago, when 1,000 tons a day was considered good performance on asphaltic-concrete paving. That concept is now a thing of the past. The figure was more than doubled near Dallas, Texas, by Public Construction Co. of Denton. The company assembled two asphalt plants, set them both up on a 5-mile divided highway, and made paving news.

The project was a relocation of U. S. 67 east of the city, which will relieve a serious traffic situation. Several other contracts have also been let, some for portland-cement-concrete pavement and some for asphaltic concrete. The \$425,000 Public Construction Co. job with the Texas Highway Department is situated just outside the Dallas city limits.

The relocation, which will straighten the obsolete highway and improve its traffic-carrying characteristics enormously, consists of two 24-foot roadways separated by a 40-foot grassed median. The grade was built under a previous contract, and a subbase laid and rolled. It consisted of 18 inches of crushed rock figured according to loose measurement. Resident Engineer K. C. Cade estimated that this rolled down to a compacted thickness well over 12 inches.

Public Construction's contract called for about 44,500 tons of hot-mix asphaltic-concrete paving; 34,595 cubic yards of crushed-rock shoulder work; 55,672 gallons of MC-1 cutback asphalt prime; a 4-inch gravel base; and miscellaneous items such as concrete curb and gutter work where the grassed median gives way to raised-curb median dividers.

Plants Are "Best Combination"

According to project officials, it has been a dream of long standing with President W. M. Jagoe of the Public Construction Co. to assemble the equipment which operated so satisfactorily. It was his thought that an ideal asphalt plant should include the best features of the several stock models. He proceeded on that plan.

Except that the second and newest plant did not yet have its second dryer installed, both setups were identical. The second dryer will be installed on the new plant as soon as the first lull between jobs appears.

Each plant was arranged so the batch trucks drove through under the pugmill gates. In each plant there is a Madsen 3,000-pound pugmill mixer driven by a Caterpillar D13000 diesel engine through 8 V-belts. Both plants have a Simplicity 8 x 15 dryer and Simplicity dust-collection blowers. A Caterpillar D8800 drives the dryer and another D8800 drives the blowers. The older plant has, in addition, a 100-ton-an-hour Cedarapids dryer, which will soon be duplicated on the new plant.

Sizing screens for both plants are Cedarapids and are chain-driven from a driveshaft on the pugmill. The cold elevators on both plants are driven off the dryers by power furnished through the D8800 Caterpillar engines.

Each plant has several pieces of important auxiliary equipment. There is a shop-built 4-compartment feeder bin at each plant, which is fed by a Northwest clamshell crane. Each feeder bin

in turn sends the proper amount of four sizes of material to the cold elevator, which raises it to the dryer intake.

These feeder bins were designed and made under Mr. Jagoe's supervision, and they give a positive, variable feed of any size of material. A 2-way reciprocating feeder is mounted in the center, under the bins, and the gates admit material to the feeder pans which move back and forth off the feeder driveshaft. The gates are adjustable, so the proper amount of various sizes can



C. & E. M. Photo

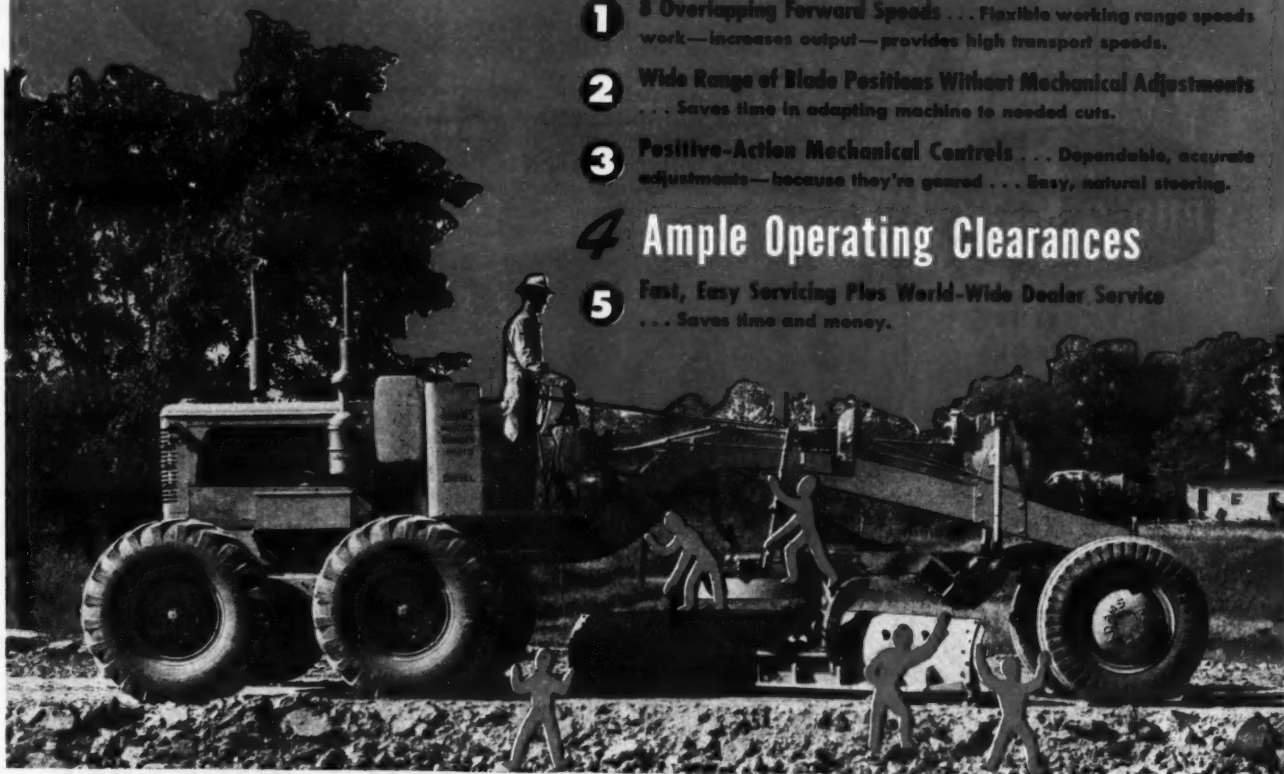
Two Adams Black Top Pavers lay hot-mix on the U.S. 67 relocation east of Dallas. be admitted to the dryer without any rejection of material. The feeders are each driven by a small Waukesha

(Continued on next page)

Only Adams

gives you this exclusive combination of advantages

- 1 8 Overlapping Forward Speeds . . . Flexible working range speeds work—increases output—provides high transport speeds.
- 2 Wide Range of Blade Positions Without Mechanical Adjustments . . . Saves time in adapting machine to needed cuts.
- 3 Positive-Action Mechanical Controls . . . Dependable, accurate adjustments—because they're geared . . . Easy, natural steering.
- 4 Ample Operating Clearances
- 5 Fast, Easy Servicing Plus World-Wide Dealer Service . . . Saves time and money.



Quick, easy adaptation to work...operator comfort, convenience, efficiency

Blade clearance—plenty of it, in the right places—is essential to fast, efficient blade positioning. That's why Adams Motor Graders are designed and built with an abundance of blade clearance at these critical points:

- Between Blade Ends and Tires: Lots of room here for sharp blade angles—without tire interference, front or rear.
- Between Blade Heel and Frame: Plenty of space provided for free movement.
- Between Blade Assembly and Frame: Adams arched frame permits higher blade lift—better clearances in coming out

of ditches and in getting over sharp-angle approaches to bridges and rail crossings.

• Between Blade and Scarifier Block: Ample room for easy reversing of blade under block.

This important feature means that all desired blade positions are obtained quickly, easily—one of the many reasons why Adams Graders are the fastest, smoothest, most accurate and efficient on the market.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

Make your next
motor grader an

Adams

Mated Plants Make Hot-Mix Paving News

(Continued from preceding page)

engine.

Each plant used steam from a 75-hp horizontal Lucey boiler, but these boilers were so arranged that one would run both plants if the other was down. Both boilers were together and took heavy No. 5 fuel from a 10,000-gallon tank near by. They furnished steam for the coils in four 10,000-gallon asphalt-storage tanks, they furnished power for the pugmill gates, and they atomized dryer fuel at the burners.

Sand and rock came in by railroad, and the cars were spotted on a railroad siding which paralleled the plant setup. A Northwest crane with a clamshell bucket served each plant, which was back about 120 feet from the railroad and approximately 500 feet from its mate.

The plant site was about 3 miles from the job, and when both plants were



C. & E. M. Photo

A Buffalo-Springfield 3-axle tandem roller makes the first pass over fresh asphaltic concrete laid on the Dallas relocation.

running it required about 25 dump trucks to handle the material. The trucks hauled approximately $7\frac{1}{2}$ tons per load, and carried the loads uncovered to the placing point. Temperatures of asphalt and rock were kept down between 325 and 350 during mixing and placing.

two laydown machines. Two Adnun pavers handled the material. They usually worked within a short distance of each other. Each machine laid a 12-foot lane, the two laying 24 feet, and two rollers compacted what the spreaders placed.

Plans called for a finished thickness of $5\frac{1}{2}$ inches. This was attained in three courses: two base courses with $2\frac{1}{2}$ -inch compacted thickness, and a $\frac{5}{8}$ -inch surface course of Type F material.

The grade was first prepared by making a 4-inch gravel subbase on top of the previous work. Gravel for this work was trucked in from a commercial layout near Grapevine, 36 miles away. The gravel was dumped, spread, watered, road-mixed by motor graders, and pneumatic-rolled. It was finished to survey blue-tops set every 100 feet to very close tolerances.

The top of this base was primed with a 0.6 gallon of MC-1 per square yard, several days in advance of asphalt paving.

The Adnun machines operated on a line established by survey hubs, with a tight string stretched as a reference point. After the first course the string was no longer necessary. Both machines had separate crews, and altered

(Concluded on next page)

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Field Laboratory Controls Mix

The asphaltic-concrete mix was patterned after the standard Texas Highway Department design for this material, but field control was a function of the Resident Engineer and a field laboratory. Here the materials were sampled, screen analyses made, extraction tests run, and samples prepared for stability tests.

Specifications covered two types of asphaltic concrete, both of which use OA-90 as the asphaltic cement. There were approximately 40,000 tons of Type A, which is a coarse-graded mix, for the two lower courses. There were 4,500 tons of Type F, which is a fine-graded upper wearing course material, with $\frac{3}{8}$ -inch maximum-size particles.

Specifications for the Type A material follow:

Size Particles	Per Cent of Mix
2-inch to 1-inch	19.2
1-inch to $\frac{1}{2}$ -inch	20.8
$\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch	16.7
$\frac{3}{4}$ -inch to No. 10	12.6
Total material + No. 10	69.3
No. 10 to No. 40	3.8
No. 40 to No. 80	11.1
No. 80 to No. 200	10.2
Passing No. 200	1.7
Asphalt, OA-90	3.9

Pavers Also "Double Up"

The output of both asphalt plants, often running as high as 2,050 tons in a 9-hour run, made it necessary to use

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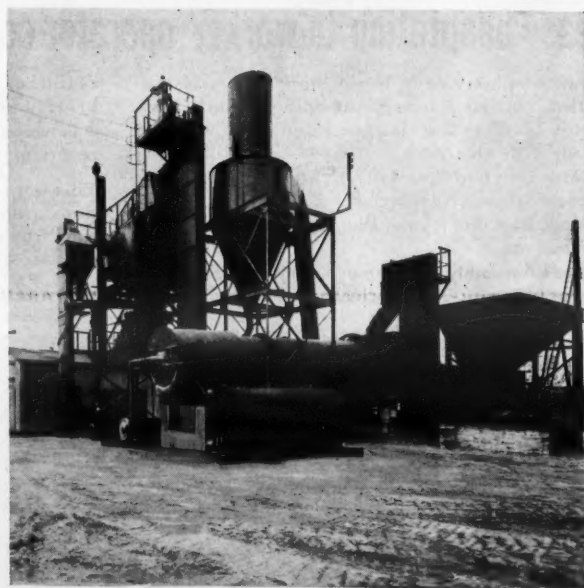
ILLUSTRATED BULLETIN, detailed specifications, and prices sent upon request.

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CUMMER ASPHALT PLANTS

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- Equipped with cold storage bin and feeder
- Enclosed cold elevator
- Dryer
- Low pressure burners
- Enclosed hot elevator
- Mixing tower with screens and mixer
- Dust collection system consists of large cyclone 10' 0" diameter—discharging into hot elevator. Filler added by separate elevator with storage and screw into weigh hopper

Other sizes from 25 to 100 tons per hour (complete drying and mixing units) available

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Literature on request

THE F. D. CUMMER & SON COMPANY

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Cleveland 15, Ohio

USA

nate truckloads of asphaltic concrete were routed in by the spotter. Two rakers trimmed the center joint and spread any large rock which ran out to that point.

The first rolling, immediately behind the Adnurn pavers, was made by a 14-ton Buffalo-Springfield 3-axle tandem machine. A 10-ton Buffalo tandem did the finish rolling.

There were many odd-shaped areas in the job, consisting of crossovers, turnouts, and so on, which were inaccessible to ordinary laydown machines. The asphaltic concrete was spread in some of these places by a field-altered Eagle spreader box operated from a dump truck. It worked satisfactorily, and on days when the smaller areas were being paved only one asphalt plant was used.

The asphaltic-concrete pavement was not sealed, since the top course is a dense graded mix. The shoulders of crushed white limestone along each edge of the new pavement give a pleasant contrast as well as a durable emergency parking area.

The use of two asphalt plants has successfully pulled the company out of a paving "hole" on this project. The job was started in the winter, but the crews were lucky to get the gravel base in before the rains began. Winter rains forced a shutdown of all operations, and it was March 20 before asphaltic-concrete paving could get started. It was completed by May 30, only about two months from the date paving first began.

Personnel

For the Texas Highway Department, the project was supervised by D. C. Greer, State Highway Engineer; T. E. Huffman, Engineer-Manager; with O. C. Anderson, Supervising Urban Engineer, in charge of this job. Field work was under the supervision of K. C. Cade, Resident Engineer.

George Preston, a partner of the firm, was in active charge of contract operations, assisted by Superintendent Lee Cartwright. G. G. Ricks was in charge of the asphalt-plant layout, and N. J. Stabile was Paving Foreman.

The completed paving, which ties in with other contracts east and west and with the proposed Dallas East-West Expressway, will help to cut approximately 40 minutes off the time it now takes to enter Dallas from the east and cross through town toward Fort Worth.

Civil-Engineering Handbook

A revised and enlarged edition of the "Civil Engineering Handbook" by Leonard C. Urquhart and 11 other authorities has been brought out. New material on surveying has been added, including photogrammetric practices and the legal authority and liability of the surveyor. Professors Ernest F. Brater and Horace W. King of the University of Michigan have revised the section on hydraulics to afford a "fluid mechanic's" slant on this branch of engineering. Other revisions affect the section on concrete, which has been almost completely rewritten by the President of the American Concrete Institute, Professor Herbert J. Gilkey of Iowa State College, to cover the production of good concrete under any



C. & E. M. Photo

Left to right, Roller Operator J. C. Graham, Contractor George Preston, and Superintendent Lee Cartwright, on the Public Construction Co.'s job.

conditions. Airport engineering, from both the military and civilian angles, receives comprehensive treatment, as

do soil mechanics and foundations.

All other material in the book has been carefully revised in the light of

recent developments. The handbook is designed to meet the needs of practicing engineers, especially those who are frequently confronted with problems outside their field.

The "Civil Engineering Handbook" may be obtained from McGraw-Hill Book Co., 327 W. 42nd St., N. Y. 18, N. Y. The price is \$8.50.

Massachusetts Bond Issue

Governor Dever of Massachusetts has signed a bill authorizing a \$100,000,000 state highway bond issue. A similar bond issue was authorized last year by the Massachusetts Legislature. It is expected that an increase in the state gasoline tax rate to pay for the borrowing will be proposed in 1951.

Allocations from the new bond issue will include \$37,000,000 for highways in the Boston area and \$54,000,000 for roads outside Boston. The \$53,000,000 allocated for road work outside Boston in last year's bond issue is either under contract or up for bids.



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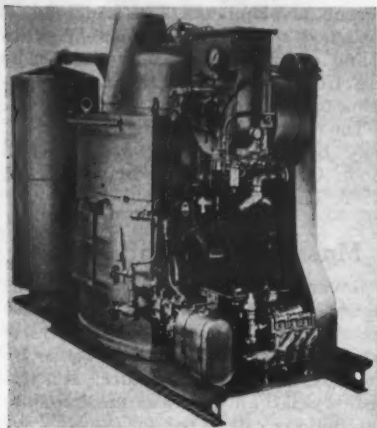
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Over 3,500 pounds of steam an hour at 75 to 300-psi steam pressure—those are the output figures on the new Model 4635 Vapor steam generator.

New Steam Generator

A new steam generator which supplies high-pressure steam for pile driving, asphalt plants, and other power or heating needs has been announced by Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill. It is said to develop 200-psi working pressure in two minutes from cold water, and to make over 3,500 pounds of steam an hour at 75 to 300-psi steam pressure.

Features claimed for the new Model 4635 include the addition of an economizer coil placed in the path of exhaust gases to increase output and efficiency, relocated motor to shorten the unit, hotter ignition spark, heavier mounting plate, increased combustion space, and increase of the working steam pressure in the reservoir to 250 psi. Steam is made only when needed. Once the unit is started, automatic controls take over. The machine turns off when the predetermined pressure is reached and on again when the pressure drops 15 pounds.

A 5-hp electric motor or gasoline engine supplies power to drive the water pump, blower, ignition, and fuel pump. The motor mounting plate is designed for easy interchanging. Safety is provided for by a steam-temperature limit control, high and low fuel and water-pressure cutouts, electric-eye cutout, safety valves, and efficient atomization. The unit cannot blow up, the manufacturer states, since there is no reservoir of water heated under pressure; water is turned into steam as it is pumped through the coil. Overall dimensions of the generator, including steam reservoirs, are 8 feet long, 4 feet wide, and 6½ feet high.

Further information may be secured from the company. Or use the Request Card which is bound in at page 16. Circle No. 36.

Mobile Mixing Plant

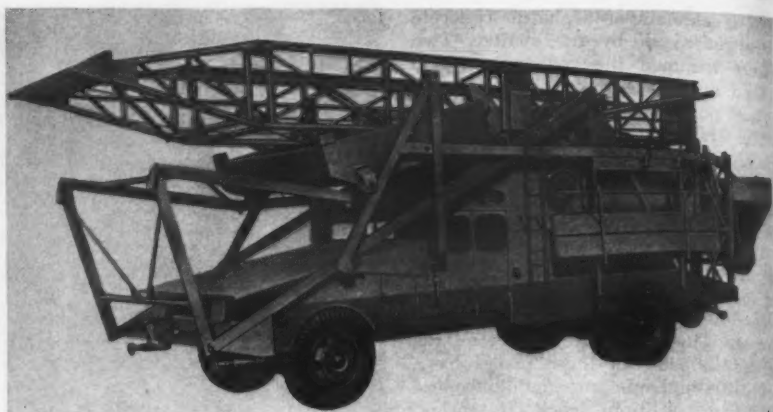
An improved model of the 2-yard Mixermobile M-7 is announced by Mixermobile Manufacturers, 8027 N. E. Killingsworth, Portland 20, Ore. It has a hydraulically operated self-loading skip for receiving batched aggregates directly from dump trucks, portable batching plants, or front-end loaders. And it has a standard 34-foot steel tower with 10-foot extensions available. From the mixing drum the mixture is transferred by a dumping spoon into the elevating bucket, then hoisted and poured into the storage hopper. Power is furnished by an 8-cylinder Chrysler industrial engine.

New features include hydraulic hoisting controls. When the drum is revolving, the mixture can be visually inspected through either front or rear openings. An improved electronic water meter that can be set and locked measures amounts of water from zero to 100 gallons automatically and without variation. Another new feature is power takeoff performed by a Power-Divider which transmits the power for skip mixing and hoisting operation

transmission. Planetary-drive clutches are provided for the skip and bucket hoist, and direct drive for the mixing drum, water pump, and hydraulic oil pump. Direct drive for highway travel provides speeds up to 40 mph. As in the previous model the operator of the M-7 Mixermobile stands on the catwalk controlling the various operations.

Folded for traveling, the 2-yard Mixermobile is 33 feet long and 12 feet high. It weighs 24,000 pounds. It passes within highway limitations anywhere in the United States and complies with standard truck highway speeds, according to the manufacturer.

Further information on this new Mixermobile may be secured from the company. Or use the Request Card at page 16. Circle No. 97.



Hydraulic hoisting controls, an electronic water meter, and power takeoff are a few features of the improved 2-yard Mixermobile M-7.

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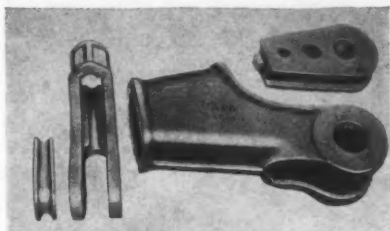
INTERNATIONAL



Sockets Cut Wear Of Dragline Rope

Wire-rope sockets designed to reduce dragline rope breakage are now being produced by Baer Steel Products, Inc., Auburn, Wash. The Baer socket and its wedge grip the rope in true-circle seats, the company states. The wide shoulders are said to limit pinching, prevent rope distortion and cutting, and prevent seats from wearing out of round. The rope will not flatten or crush.

Socket and wedge seats are matched to the size of rope for which they are specified. Each socket holds a loop of six complete strands. Gripping pressures are limited by the shoulders so that rope may flex normally at the



Baer's new wire-rope sockets are designed to reduce breakage of dragline rope. Several types are available.

socket without breaking, and so that pulling and bending stresses are absorbed evenly over the entire wedge and socket seating area, Baer says. Investment in socket castings is reduced, since one reversible wedge fits all socket types for each size of rope.

Open and closed-end and crowfoot drag sockets, in sizes to fit 1/2 to 2 3/4-inch rope, are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 50.

Changes at Burch Corp.

E. R. Standfuss has been elected President and General Manager of The Burch Corp., Crestline, Ohio, manufacturer of road-building machinery, Ross snowplows, conveyors, and dump truck bodies. He was formerly General Manager of the Shunk Mfg. Co. of Bucyrus, Ohio.

J. L. Morrow has been elected Chairman of the Board of Burch and will remain active in the corporation.



Ingersoll-Rand's new 3R-36 Spot-Air compressor delivers 36 cfm at 80 psi.

New Air Compressor For Small Air Tools

A new compressor delivering 36 cfm at 80 psi has been introduced by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. This gasoline-driven air power unit weighs 265 pounds and stands 32 inches high on a 27-inch-diameter base plate. A special wheelbarrow mounting enables one-man cartage of the compressor and air tools.

A horizontal arrangement of 3 power cylinders and 3 air cylinders spaced alternately at 60-degree intervals around a vertical single-throw crankshaft is designed to give a smooth conversion of engine power into air power without the need of a heavy flywheel. The 4-cycle gasoline engine is equipped with overhead alloy-steel valves with adjustable tappets. Exhaust valves, with Stellite seat inserts, are of the "free type" which allows rotation for longer valve life. The fuel-tank capacity permits from 2 to 2 1/2 hours of continuous operation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 102.

New Hard-Facing Rod

For applications where high hardness is desired, Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y., recommends its newly designed Eutectrode 10 hard-facing. It deposits a bead with a hardness of Rockwell C 63-68 and it's suited to the hard-facing of roller cams, rolling dies, pulverizing rollers, and similar items, because of its high resistance to abrasion.

The new ac-dc electrode combines ease of application with satisfactory weldability, according to the company, and will not become soft or lose strength at high temperatures. It is available in 1/8, 5/32, and 3/16-inch-diameter rods, and has the patented FrigidArc coating which makes it possible to hard-surface gray cast iron, steel, high-speed steel, and malleable cast iron at low base-metal heats.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 80.

Catalog on Shovel-Crane Cites 12 1/2-Ton Capacity

Applications, construction details, specifications, and features of the HC-51 truck-mounted shovel-crane are highlighted in Catalog No. 2322 offered by Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago 1, Ill. Designed for a 12 1/2-ton lifting capacity, the HC-51 features hydraulic Speed-o-Matic controls, front-drum reversing mechanism for power-control load lowering, and a heavy-duty carrier specifically designed for truck-crane operation.

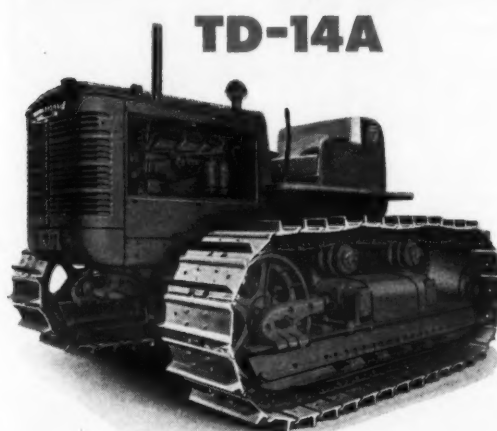
The folder points out that the HC-51 is convertible to all conventional front-end attachments. Full details and on-the-job illustrations are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 31.

than we claimed!



TD-18A



TD-14A

INTERNATIONAL DIESEL CRAWLERS GIVE YOU A BONUS OF POWER

Official tests of the three latest models of International crawlers show how conservative International Harvester's advertised horsepower ratings have been.

A board of university engineers tested each of the tractors illustrated and found that it had substantially higher drawbar horsepower than we had claimed—as shown in the figures, above.

No wonder owners have found that International crawlers outwork every other tractor of similar size. No

wonder the giant TD-24 has stolen the show on every big job it has tackled.

It is the policy of International to deliver more for the money than buyers expect. That's why you get a bonus—not only in horsepower but also in product quality—every time you buy International.

Ask your International Industrial Power Distributor, or write direct, for copies of the official test reports to aid you in your equipment planning.

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INDUSTRIAL POWER



Mass Excavation Speeds Housing Job

Unusual methods of construction are speeding the erection of small private homes at Ronek Park, a low-cost housing development in North Amityville, Long Island, N. Y. Time-consuming and expensive methods of digging excavations separately, hauling and dumping excess earth, and grading streets and roads, have been abandoned in favor of an assembly-line technique by Ronek Construction Co., Islip, N. Y.

The firm uses a Tournapull to dig a 2½-foot-deep trench in which decks for the 5-room homes are placed at 60-foot intervals. Spaces between the decks are filled with earth from the trench. Capable of holding 9 tons of earth gained by the digging operation, the Tournapull eliminates the use of cranes and trucks. Under ordinary conditions the 1,000-foot cycle of scraping, dumping, and returning for another run is completed within three minutes.

The unusually wide 50-foot avenues called for in Ronek Park are graded rapidly, and earth obtained from this operation is used to build up the sidewalk areas and as landscaping fill in sections of the development where extra earth is required.

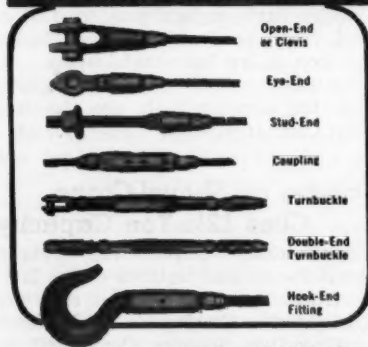
The first two sections of 93 homes each are nearing completion, and framework has been started on the third section of 80 dwellings. Construction of the fourth and fifth sections will begin soon, and it is expected that by the end of this year the 400 homes already sold will be completed.

Wood and Metal Saw

A new portable all-purpose power saw designed for cutting and trimming a wide variety of materials has been announced by E. R. Princeton & Associates, 2456 W. Diversey Blvd., Chicago 47, Ill., distributor for the manufacturer, Tri-Saw Corp., St. Louis, Mo. The Tri-Saw fits into any ¼-inch electric drill and can be used with regular hacksaw blades. It cuts directly into floors, walls, and other surfaces without a starting hole. Various blades may be used to cut woods, plywood, asbestos, hardwood, sheet metal, and other materials.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 121.

IS RE-ROPING ONE OF YOUR "Headaches"?



If so—look to Electroline Wire Rope Fittings! These permanent wire rope fittings prolong the life of wire rope by damping vibration stresses and overcoming rope fatigue at entrance to fittings—Electroline Fittings Definitely Minimize Re-Roping!

But this is just one of the many outstanding advantages of these positive-grip fittings. Send for illustrated, pocket-size Catalog and learn how you'll profit by using Electroline Wire Rope Fittings.

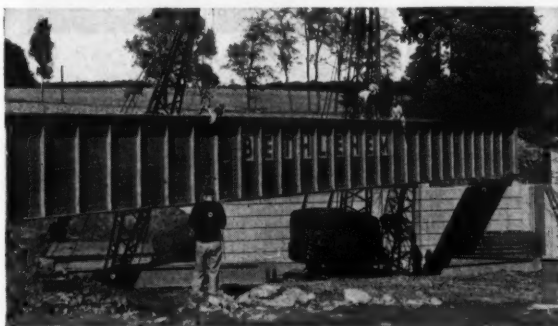
Electroline Company
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CHICAGO 9, ILLINOIS



Frank Romano of the Ronek Construction Co. directs the driver of a Tournapull in Ronek Park, low-cost private-home development in North Amityville, Long Island. The machine mass-digs home excavations; then dumps soil where extra fill is needed. Combination of these operations eliminates the need for trucks and cranes and speeds up construction schedules.

On the Turnpike Extension

By extending the eastern end of the famous Pennsylvania Turnpike from Middlesex, Pa., to King of Prussia, northwest of Philadelphia, the Pennsylvania Turnpike Commission has brought closer its goal of a limited-access toll road spanning the Keystone State from east to west. The accompanying pictures were taken at various points along the new 100-mile Turnpike extension, and show representative uses of some of the steel products furnished by Bethlehem for this most famous of express highways.

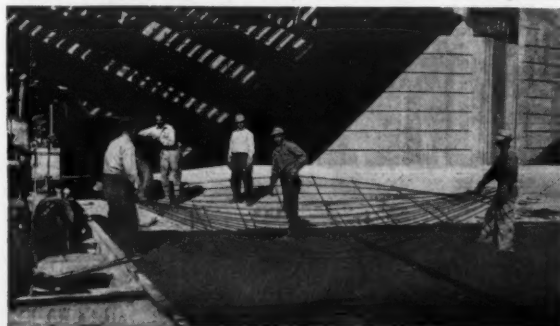


Large Bethlehem-built girder, one of many steel girders used in constructing new Turnpike bridges, being inched into place by heavy crane.



Bethlehem Dowel Unit, designed to minimize load-transfer problems by permitting free movement of dowels in slab, about to be covered with concrete.

Workmen carry Bethlehem Hinged Bar Mat into place after first pour. Mat folds over double, installs fast. Completed lanes shown in background.

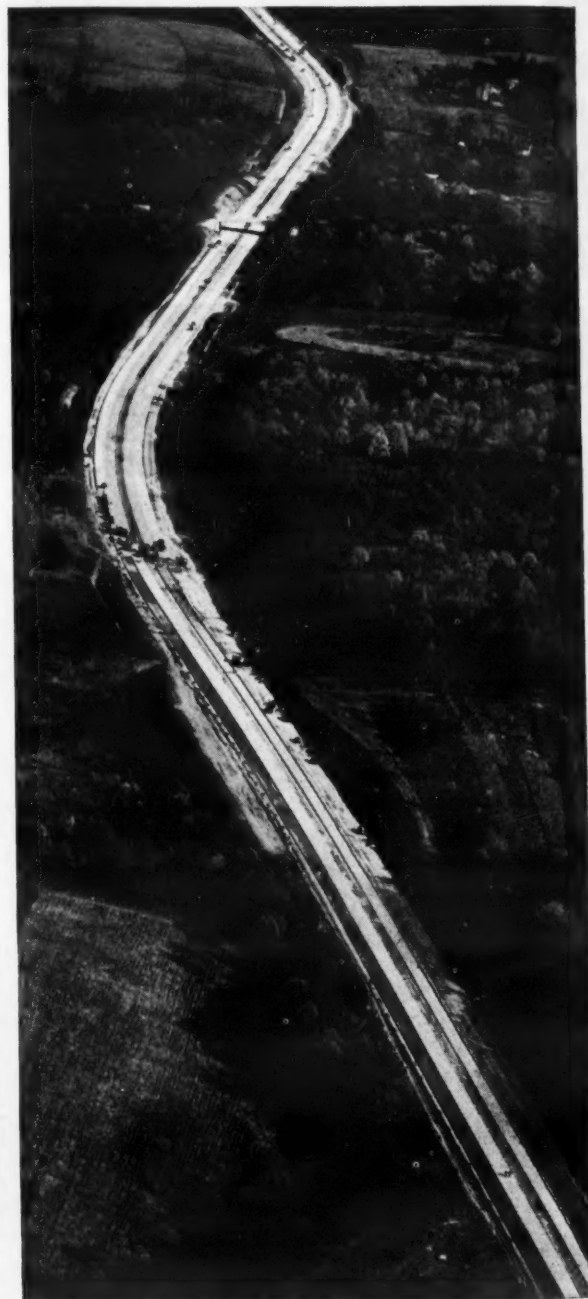


Three Awards for Senior Civil-Engineering Students

The Eschenbrenner Awards, three annual \$500 prizes for senior civil-engineering students, have been announced by the Universal Concrete Pipe Co., 297 S. High St., Columbus, Ohio. The purpose of the awards is to stimulate original thinking in the design, fabrication, and use of concrete products. A jury will judge the entries on ingenuity and originality of ideas; thoroughness of research; design; description or procedure; practicability of the result; and technical competence of the presentation.

The awards are open to all senior civil-engineering students in recognized institutions east of the Mississippi. Papers must be submitted to the company by March 31, 1951. Winners will be announced on May 15.

Complete details are given in printed brochures which are being distributed to students at the opening of the fall term.



Airview showing construction activity on 100-mile eastern extension of the Pennsylvania Turnpike, at a point approximately due south of Lebanon, Pa.

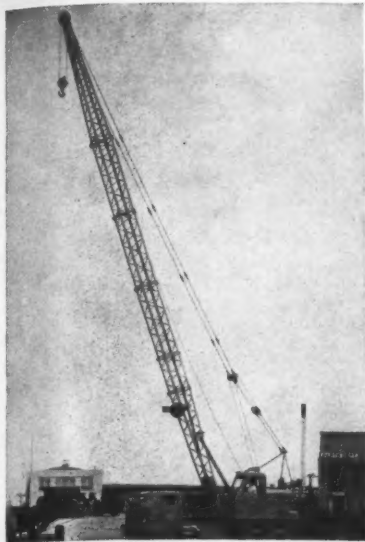
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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

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With one-man control, an optional feature of the Unit 1520T truck crane, the machine can be propelled from the engine in the upper structure.

A New 20-Ton Crane With 3/4-Yard Bucket

The new Model 1520T truck crane, announced by Unit Crane & Shovel Corp., Milwaukee 14, Wis., has a 20-ton lifting capacity and a 3/4-yard bucket capacity. It is mounted on a 3-axle tandem-drive crane carrier equipped with 12-ply 11.00 x 20 tires, 2 in front and 8 in the rear. A Timken-Detroit worm-type axle unit is mounted in tandem with through drive. Walking beam supports on the rear axles equalize weight distribution and allow all rear wheels to have constant contact when traveling on uneven terrain. The wheelbase is 184 inches to the center of the tandem axles, and the overall width is 8 feet.

A standard feature of this machine is the Bendix-Westinghouse air steering. An optional feature is one-man control by which the machine can be propelled from the engine in the upper structure. A Timken transfer case not only provides the two speeds of an auxiliary transmission, but because of a full-torque power-takeoff shaft, can propel the carrier and absorb peak loads transmitted from the upper engine, Unit says. Adjacent to the usual controls in the upper structure are the air-brake and steering valves which remotely control these operations in the chassis.

Standard power installations are a Waukesha 6 MZA engine in the upper structure and a Waukesha SRKR in the chassis. Diesel installations are a GMC 3-cylinder in upper; 4-cylinder in carrier. Approximate weight of the 1520T, with 35-foot boom, exceeds 50,000 pounds. It has 5 speeds forward and 1 reverse, with a 2-speed transfer case offering 10 speeds forward and 2 reverse. Road speed is rated at 30 mph. An independent worm-type boom hoist, operated by multiple disk-clutches running in oil, is standard. A high gantry for long-boom applications is retractable for low headroom when traveling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 91.

Gallaway Heads ISEA

Charles H. Gallaway, Sales Manager of the Safety Products Division of American Optical Co., Southbridge, Mass., was elected President of the Industrial Safety Equipment Association at the association's annual meeting held the last part of June at White Sulphur Springs, W. Va. He succeeds Lawrence E. Dickson, President of Standard Safety Equipment Co.

E. L. Wheeler, of Wheeler Protective Apparel, Inc., Chicago, succeeds Gallaway as Vice President. Stewart N. Clarkson was reappointed Secretary-Treasurer.

Instruments for Surveying And Other Engineering Jobs

A complete line of surveying and engineering instruments—transits, engineers' levels, alidades and others—is described in the edition of Catalog No. 50 newly revised by W. & L. E. Gurley, Troy, N. Y.

The 66-page catalog illustrates various stages in the manufacture of Gurley instruments, from lens grinding to collimation. Glass reticles—an exclusive Gurley development in surveying instruments—are described and several unusual designs are shown.

The various transits discussed include the Hell Gate Precise transit—both engineer and the mountain and mining models; the Standard Precise transit—engineer and reconnaissance models; mining transits; the telescopic solar transit; and the contractors' and engineers' transit. Illustrated, too, are Gurley wye, dumpy, and precision tilting levels.

Other Gurley products described are

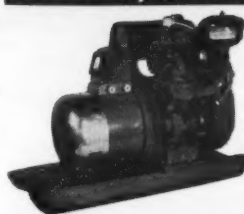
standard explorers' alidades, plane table outfits, tripods, drawing boards and drawing paper, geodetic rods, wind instruments, hydraulic measuring instruments, current meters, wading rod sets, rain and snow and hook gages, plumbets and hand levels.

This literature may be obtained from the company by requesting Catalog No. 50, or use the Request Card at page 16. Circle No. 54.

Chief Engineer Named By The Asphalt Institute

Walter F. Winters, formerly Special Projects Engineer at the Denver Office of The Asphalt Institute, is now Chief Engineer of the Institute, with headquarters at 801 Second Ave., New York City. The office of Chief Engineer was previously held by Bernard E. Gray in addition to his duties as President.

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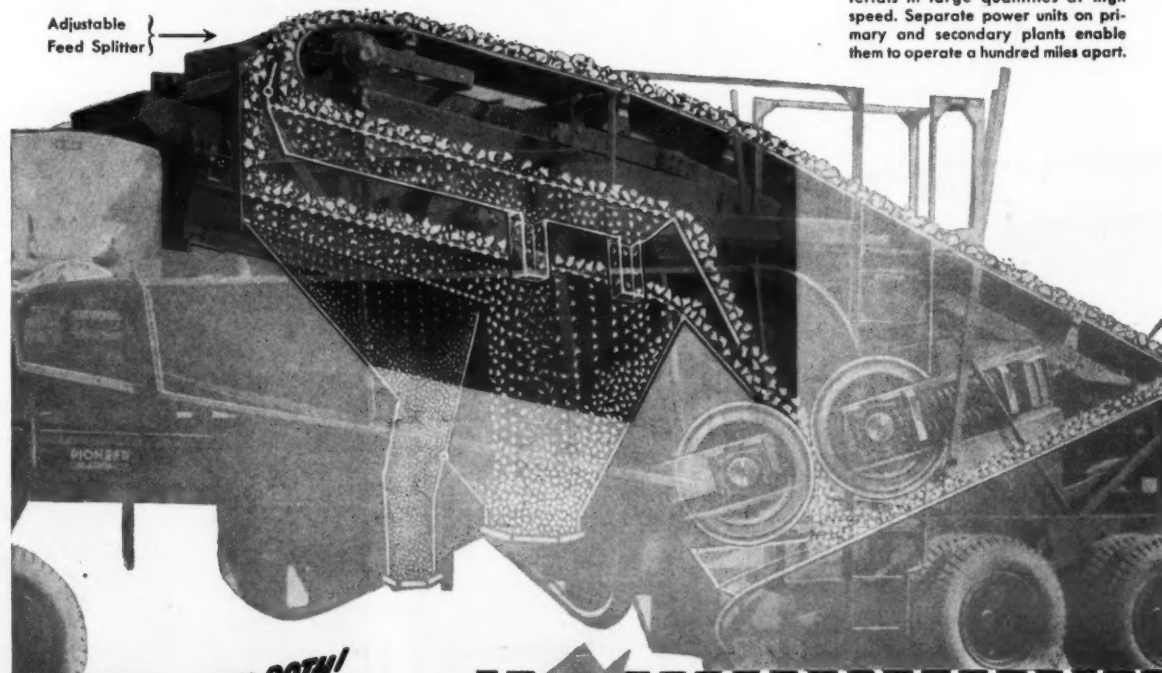
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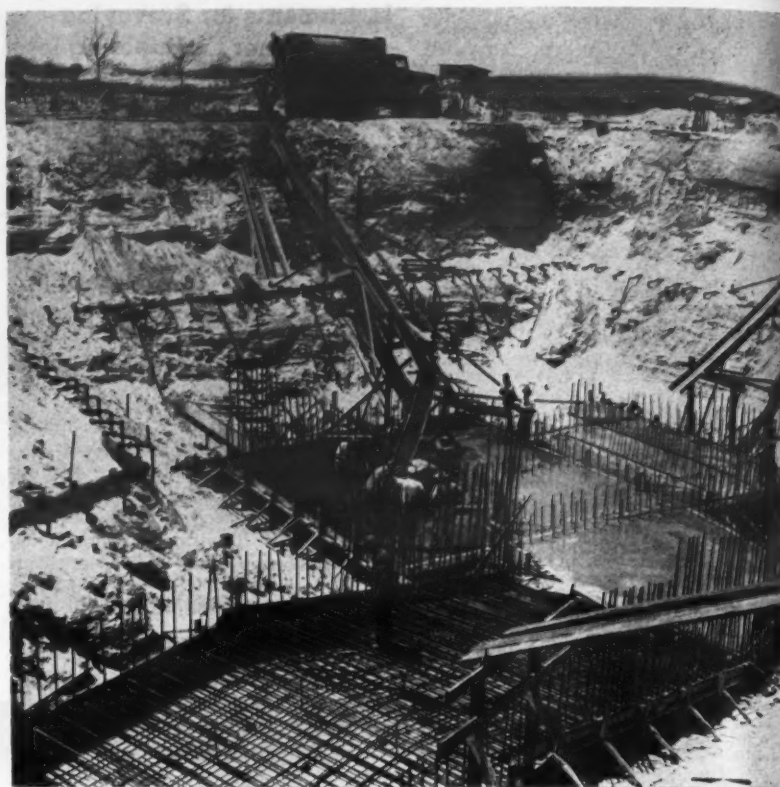
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Foundation Equipment Corp. Photo

A wellpoint header line at elevation minus 12 permits foundation work in the dry, down to elevation minus 24, for the elevator shaft and stairwell of Jones Beach marine stadium. This photo was taken at the inshore end of the stage-to-stadium tunnel.



C. & E. M. Photo

A Box Motomixer on the bank chutes concrete into a 125-yard section of the 2½-foot-thick foundation slab of the shaft and stairwell. Island Transit-Mix Concrete furnished the concrete from its plant at Farmingdale, Long Island, 15 miles away.

Marine Amphitheater Founded in Sand Fill

Substructure Built on Sand Fill Pumped Into Bay; System of Wellpoints Holds Back Water At Site

♦ A NEW concrete, steel, and brick marine stadium and stage is under construction at Jones Beach State Park on the south shore of Long Island, New York. The big amphitheater, seating 8,200 is replacing a timber structure with similar seating capacity, built in 1933 by the WPA and torn down a few years ago when it became structurally unsafe.

Construction on the new stadium, which will cost approximately \$3,500,000, began in September, 1949, and is scheduled for completion by February, 1952. Musical comedies, operettas, water

shows, and other outdoor productions will be presented on the modern revolving stage separated from the stands by a channel 100 feet wide. An underwater tunnel will connect the stage and stadium. The stadium will also be used for swimming, diving, and other aquatic competitions and events.

Construction is under the general supervision of the Jones Beach State Parkway Authority, and the Long Island State Park Commission. The initial contract for the substructure was awarded to Lenart Constructors, Inc., of New York City on a low bid of \$738,500 and will be finished this fall. The superstructure work will be done under a separate contract.

The stadium is located at the northwest end of Zachs Bay, a sheltered body of water separated from the Atlantic

By WILLIAM H. QUIRK,
Eastern Editor

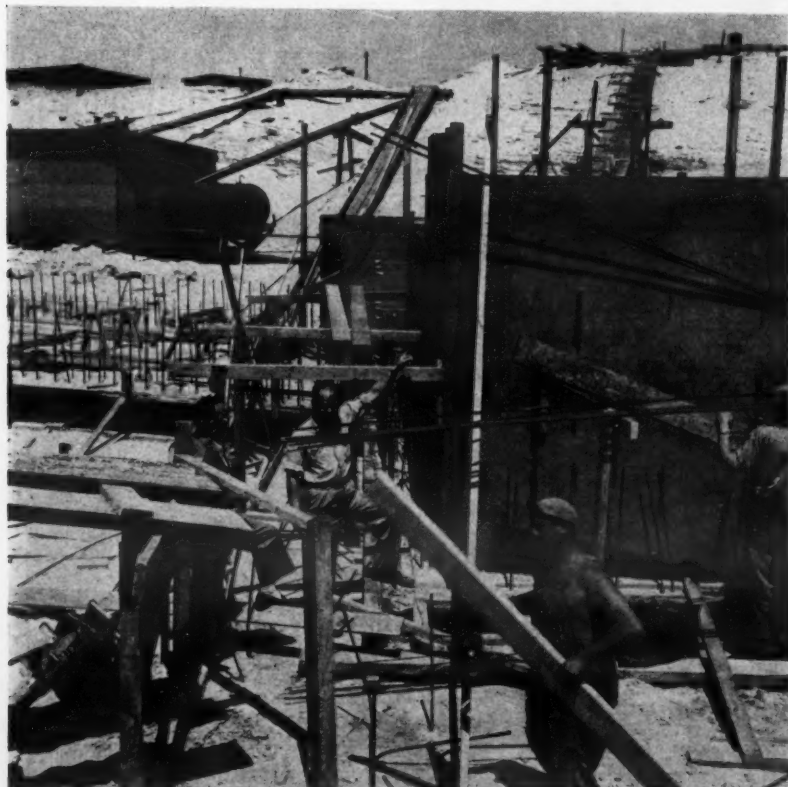
(Photo on page 1)

Ocean by a barrier reef that forms the ocean-front park. A connection from the bay to the state boat channel insures clean water at the upper end of the bay through continual circulation and tidal currents. When completed, the stadium will have front and rear dimensions of 264 feet 8 inches and 483 feet 6 inches respectively, measured on the arc; its average width is 141 feet 6 inches. Across the narrow strip of water, the semicircular stage will present a 200-foot front to the audience. To the rear the radius is 93 feet measured from the center of the stage. The revolving portion of the stage will have a 38-foot radius.

Built on Sand Fill

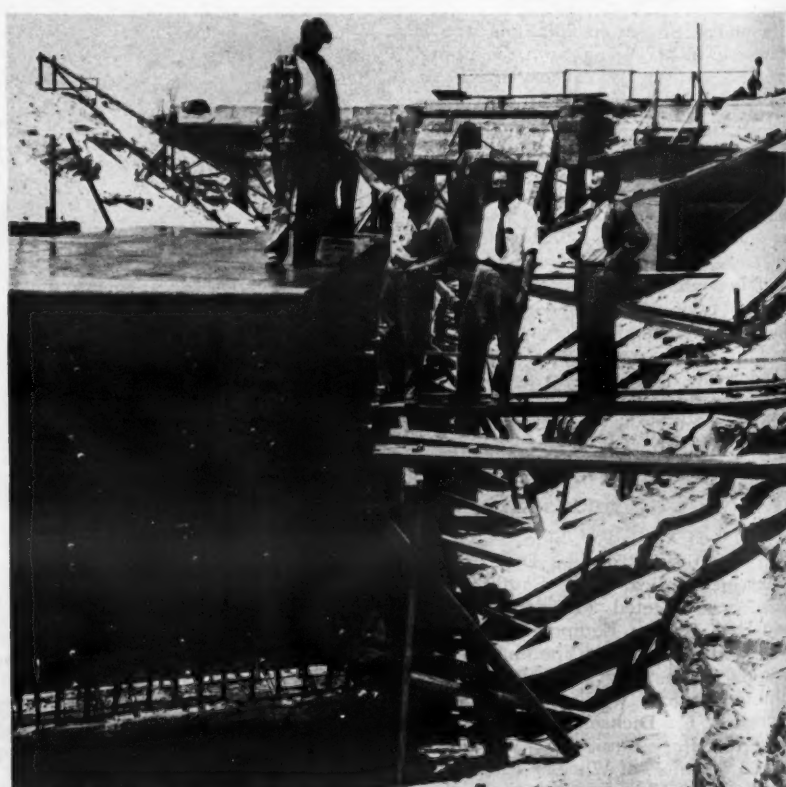
Before the start of any construction, the contractor filled in the corner of the bay at the site of the work to form a work platform. A dredge operating in the vicinity was engaged to pump some 60,000 cubic yards of hydraulic fill from the bottom of the bay adjacent to the site. The material built up an area approximately 600 feet square, in water ranging in depth from 6 to 22 feet. No bulkheads were built, the fill being permitted to take its natural slope. Dredging continued until the sand flat was about 3 feet above water level. Then a dozer pushed the sand from the center to the edges to form a berm or dike 5 feet high around the perimeter as further protection against high water. The sand fill touches the shore on one

(Continued on next page)



C. & E. M. Photo

Here plywood forms for the stairwell have been set up with Richmond ties. Field Engineer Bill Hogan of Lenart Constructors, Inc., points to the formwork. Ed Allen, Jr., CAEMonthly Promotion Manager, looks on.



C. & E. M. Photo

These are forms at the end of the box-shaped tunnel, which has 1-foot 4-inch walls and roof, and 2-foot floor. With Hogan and Allen in this picture are Carpenter Foreman Anton Christiansen and General Superintendent Eugene Gibbons.



Long Island State Park Commission Photo

The Jones Beach marine amphitheater is built on a dredged sand fill at the northwest end of Zachs Bay. When the stands and stage are completed, a channel will be cut between them.

side, thus providing ready access to the stage portion of the stadium. This connection will be dredged out later in cutting a channel between stage and stands.

This method of getting started on the substructure was chosen by the contractor in preference to building a caisson or cofferdam out in the bay, and operating pumps continually to keep it unwatered. The sand fill was completed in November, 1949, permitting the driving of piles, used in the foundation, during the winter months. The pile work was completed last May. It consisted of 1,300 cast-in-place 14-inch reinforced-concrete piles, averaging 20 to 30 feet long, the deeper piles being driven for the stage.

Armco shells were used for the 26,000 linear feet of pile required for the job. Driving was done by a Bucyrus Erie 51-B crane rig equipped with a 50-foot boom and 75-foot steel leads. A combination of jetting and driving was required to get the piles down through the tightly compacted sand. Two 4-inch 3-stage jet pumps supplied water at 125-pound pressure for 2½-inch jet pipes, 35 feet long, which slid down the leads on each side of the pile. At the ends the jet pipes reduced to 1½-inch nozzles. The crane rig worked on timber mats to keep it on a level plane, and the leads were carefully plumbed to insure that the piles were driven straight.

With the powerful jets functioning, the piles went down through the sand without trouble, helped along by a Vulcan No. 1 single-acting steam hammer resting on a 12-inch pipe mandrel inserted in the pile casing.

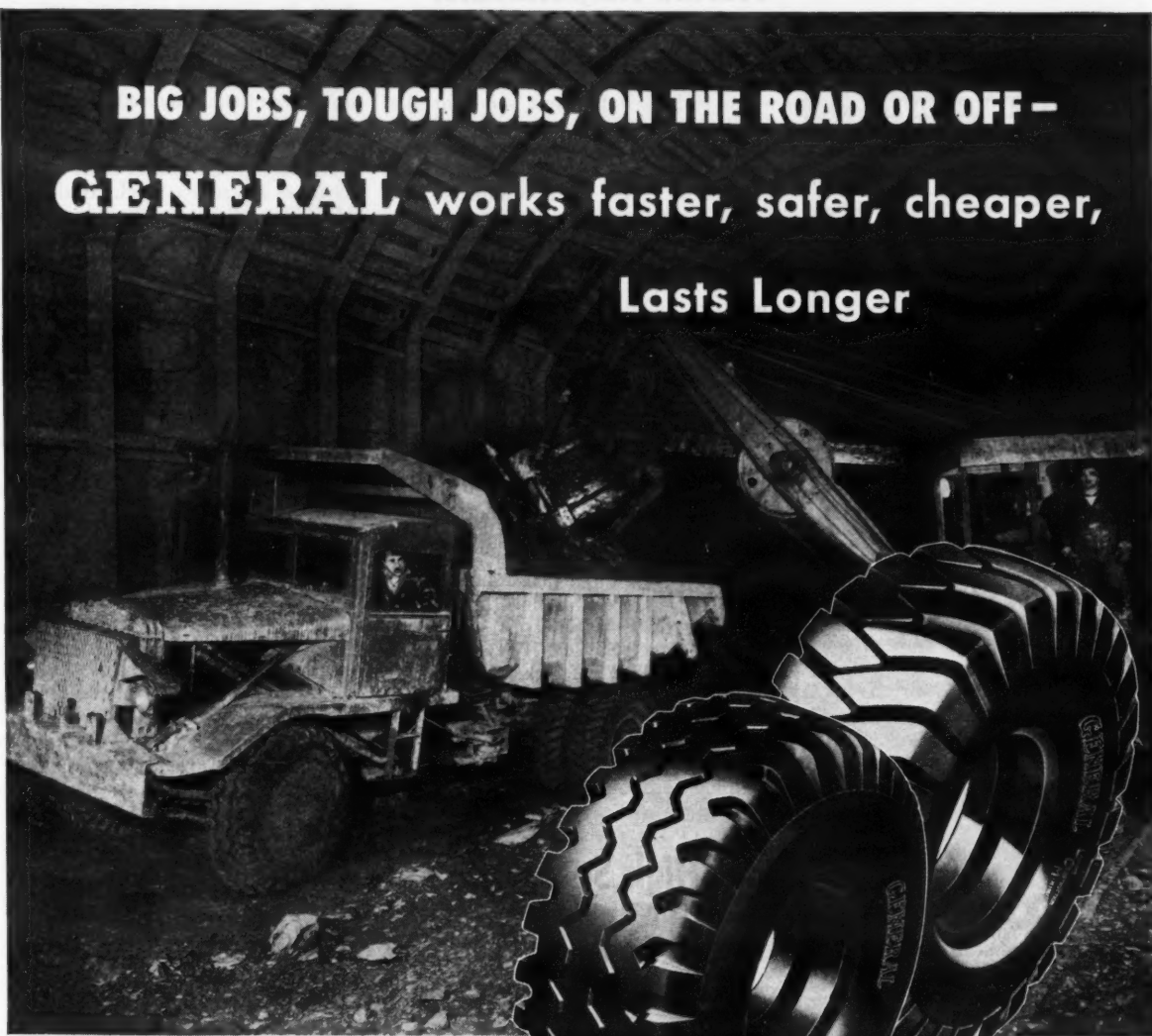
Concrete Placement

Concrete aggregate for the pile casings, and for the rest of the substructure, was furnished by Island Transit-Mix Concrete, with offices at Wantagh, Long Island. Truck mixers for the Jones Beach project came from the plant at Farmingdale, a 15-mile one-way haul. The aggregate, together with water, was put in at the plant, cement being added at the job site. Crushed stone for the mix was supplied by the Trap Rock Co. of Haverstraw, N. Y., while local Long Island sand served as the fine aggregate. As many as eight truck mixers, usually Rex 5½-cubic-yard Motomixers, supplied concrete when the larger pours were made.

When the stadium was reached the truck mixers pulled under a shed for a load of cement. A batch contained 5 bags of Atlas portland cement, shipped from the plant at Hudson, N. Y., and 1 bag of Snyder's Rosendale natural cement from Rosendale, N. Y. Water averaged 6 gallons for every bag of cement.

Steel-grid air-strip landing mats
(Continued on next page)

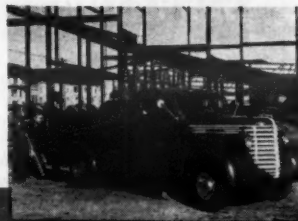
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C. & E. M. Photos

At left is a closeup of the Rex Motomixer chuting concrete into the foundation slab for the elevator shaft and stairwell at the Jones Beach project. Above, from left to right, are Field Engineer Bill Hogan, Concrete Superintendent Paul Kosara, General Superintendent Eugene Gibbons, Treasurer William Hyman, President Andrew Lenart, and Assistant Resident Engineer Barry Mayer.

Marine Amphitheater Founded in Sand Fill

(Continued from preceding page)

were laid over the soft sand for the truck mixers to run on from the cement shed out to the site. The concrete was chuted into the pile casings. Piles supporting the stage were reinforced full length, while those under the stands, inside the seawall, were merely doweled at the top. Concrete designed for 2,500-pound strength at 28 days was used in the piles, while 3,000-pound-strength concrete was required for the rest of the structure.

Concrete Footings

The foundation piles project 4 inches into reinforced-concrete footings of various lengths and widths, and ranging in thickness from 2½ to 3 feet. They contain from 1 to 10 piles, with the average footing including 5 piles. Concrete in the entire substructure contract totals around 7,000 cubic yards, which is reinforced with 410 tons of rods and bars supplied by Jones & Laughlin Steel Service, Inc., of Long Island City, N. Y. The steel was delivered to the job by truck.

Excavation at the site totaled about 20,000 yards, most of this being dug out for the stage-to-stadium tunnel, 100

feet long, at each end of which is a shaft for elevator and stairwell. The sand was removed by dozer, dragline, crane and clamshell. At the bottom of the hole a 4-inch working slab of concrete was laid, covered with waterproofing material, and topped with ½ inch of mortar for protection.

The top of the tunnel is at elevation minus 6, mean sea level. Built of reinforced concrete, the box-shaped structure has 1-foot 4-inch walls and roof slab, and a 2-foot floor. The inside clear height is 7 feet 4 inches, while the width is divided into two sections by a block partition. The smaller portion, a 3-foot-wide service chamber, will carry utility lines from shore to stage, while the larger 10-foot-wide passage will be for personnel, props, and scenery for the productions. The sides and roof of the tunnel are covered with a 5-ply membrane waterproofing, and over that for protection is an 8-inch slab of concrete. Eventually, when the fill is removed, the top of the tunnel will be submerged under 6 feet of water.

Wellpoints Needed

The excavation hole went down to minus 24 elevation, for the floor slabs of the two elevator shafts are at minus 21, with a 2½-foot layer of concrete beneath that level. With one end of the

(Concluded on next page)

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deep hole only 40 feet from the edge of the bay, a Foundation Equipment wellpoint system was installed around the open cut to hold back the water. An 8-inch header line, about 700 feet long, was laid between the bay and the line of the tunnel at 0 elevation. At 5-foot centers 1½-inch risers, 21 feet in length, were jetted down through the sand. With one 3,000-gpm pump at work on the first header line, and with another standing by, the ground water was drawn down to minus 12 elevation.

Then a second header was installed at minus 12 elevation. The new 8-inch line, about 600 feet in length, encircled the tunnel area completely. Because of the extremely fine seashore sand, 8 to 10-inch jet holes were first opened up and backfilled with coarser sand before the risers were inserted. In this way the finer material was kept away from the screen on the risers, and trouble with clogging was reduced. A total of 250 risers, also 21 feet long, were hooked to this 8-inch line on 2½ to 3-foot centers. A weir was installed to measure the flow of water pumped out by the two wellpoint pumps connected to the header. Strangely enough, the discharge from the end of the line near the bay side was about 2,000 gpm, while the inland pump delivered only around 200 gpm.

An investigation revealed that layers of old bay-bottom silt bordered the land side of the hole with the top of the strata at minus 29 elevation. The bottoms of the risers down to minus 32 elevation were operating at greatly reduced efficiency in the impervious material. The 21-foot risers were then removed and replaced with risers 17 feet long. This brought their tips just above the level of the silt in a layer of granular material. To handle water at higher ground levels, shorter-length risers were also installed on the lower header line. With this arrangement the water was drawn down to elevation minus 25, permitting the deepest concrete to be poured in the dry.

Formwork

Forms for the tunnel, shafts, and other portions of the substructure were constructed of ¾-inch plywood backed with 2 x 4 studs on 12-inch centers, and double 2 x 6 walers on 2½-foot average centers. Richmond form ties held the panels together. Formwork was speeded by prefabricating sections as much as possible at the carpenter shop at the site, which was equipped with a Walker-Turner band saw and a Beach table saw.

A system of chutes was set up at the site for placing the concrete in the forms as it was delivered by the truck mixers. Since these substructure pours were mainly below ground level, the gravity flow via the chutes worked out satisfactorily. Curing was done with either water or Sisalkraft paper.

Personnel

Lenart Constructors, Inc., employed a force of 45 on the stadium substructure.

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C. & E. M. Photo

A Rex 5½-cubic-yard Motomixer on a White truck picks up a load of cement at the job site of the Jones Beach marine stadium.

ture under the supervision of Eugene Gibbons, General Superintendent. Paul Kosara is Concrete Superintendent, and Bill Hogan is Field Engineer.

Skidmore, Owings & Merrill, consult-

ing engineer of New York City, is supervising the construction for the Long Island State Park Commission. The consultants are represented by Col. L. B. Roberts, Resident Engineer,

assisted by Barry Mayer.

Robert Moses is President of both the Long Island State Park Commission and the Jones Beach State Parkway Authority. Arthur E. Howland is Chief Engineer and General Manager, and Sidney M. Shapiro is Deputy Chief Engineer.

Eight Equipment Carriers

Described in New Folders

Heavy-duty trailers with capacities from 15 to 75 tons are described in two new folders prepared by Fontaine Truck Equipment Co., Inc., P. O. Box 1591, Birmingham 1, Ala. The C8 model illustrated and described in the first of these circulars carries equipment weighing from 15 to 30 tons. The C16 models, with their double line of rear axles, handle equipment from 45 to 75 tons. Each model is fully described and illustrated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 18.

service life
increased 5000%
with
AMSCO® Hardfacing!



Post Hole Digger now digs 206 holes in rocky soil before repointing

Just 4 holes was the former life of a new point and blade on this power-driven post hole digger. After hardfacing with AMSCO Tube Tungsite, the same blade and point dug 206 holes—51 times the former service!

Here's another example of big savings with AMSCO Hardfacing . . .

Lips and teeth of this dipper were given far greater resistance to impact and abrasion with AMSCO Economy Hardface . . . resulting in longer dipper life, lower handling costs per ton.

These are typical examples of tremendous savings made with AMSCO Hardfacing . . . savings in time, maintenance and money! Wherever any kind of part—from huge mining dippers to small drill bits—is subjected to impact or abrasion, you'll find that it pays to hardface with AMSCO Welding Products.

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Oil Field Drill Bits • Sprockets • Dredge
Pump Shells • Materials Handling Equipment • Pulverizer Hammers • Punching, Trimming, Forging Dies • Coal Cutter Bits.

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Half-Yard Excavator Has 10-Ton Capacity

Its new heavy-duty Model 20 ½-yard shovel-crane has a 10-ton lifting capacity with extended outriggers and auxiliary counterweight, says the Wayne Crane Division of American Steel Dredge Co., Fort Wayne, Ind. It is convertible to all front-end attachments, and a single engine, gasoline or diesel, supplies motive and operating power.

The Model 20 travels, lifts, booms, and swings simultaneously or independently. Four-point walking-beam suspension provides equal stability while lifting or digging. Full 360-degree operation, a 7-foot 8-inch wheel-base, and a short turning radius are said to facilitate operations in tight spots. Mounted on four sets of dual pneumatic tires, the Model 20 travels at speeds up to 15 mph.

Its upper works are enclosed in a weatherproof cab. Other features in-



The new Wayne Model 20 excavator digs a trench for an auxiliary water line at Fort Wayne, Ind. It is convertible to all front-end attachments.

clude unit replacement of all subassemblies, a built-in counterweight to shorten rear-end clearance of the cab, 15-inch-diameter drums for increased

life of the wire rope, and use of anti-friction bearings. The base plate is held by adjustable conical hook rollers which revolve around a 48-inch-diameter replaceable ball-bearing race. Standard power unit for the Model 20 is a 62-hp 6-cylinder gasoline engine; however, any of several makes of diesel or gasoline engines of required power and speed may be furnished on customer's specifications.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

Riveting Hammers

A line of riveters comprising more than 60 sizes and styles is manufactured by the Cleco Division of the Reed Roller Bit Co., P. O. Box 2119, Houston, Texas. The tubular air-thrown valve of the riveter, plus an effective plunger cushion in the valve block, is said to promote smooth action free from vibration and recoil. A large reservoir surrounds the valve block, in which air is stored and pressure built up between blows. The air is impacted in volume on the piston at each stroke, increasing the power of the blow.

The handle of these riveters is a drop forging, carefully heat-treated for strength and resistance against fatigue stresses. The cylinder, or barrel, is made up of alloy steel, hardened and ground, then honed to accurate size and surface.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 30.

Concrete-Mixer Bulletin

Bulletin B-1700-B2, which describes current models of Blue Brute concrete mixers, is announced by Worthington Pump & Machinery Corp., Harrison, N. J. Redesigned to keep overall dimensions within minimum limitations, these mixers are for use in central mixing plants, large construction jobs, and public-works projects.

Four models are described in the catalog: the 28-S (1-yard portable or stationary), the 56-S (2-yard stationary), the 84-S (3-yard stationary), and the 126-S (4½-yard stationary). The booklet illustrates how the big mixers, when installed in a central mixing plant, can be used in conjunction with truck mixers or agitators. Attachments and accessories, such as the hydraulic control system, are illustrated. Complete specifications and dimensions are given.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 20.

Hold FAST MIX SCHEDULES with VILTER Refrigeration

When concrete or its ingredients must be chilled to meet rigid specifications, don't use old-fashioned methods. Modern Vilter Refrigeration is today helping Dam Project Contractors fulfill contract requirements with fast mixing schedules. Missing a mix schedule by as little as a single minute per mix costs you money. Be certain of your profits with dependable Vilter Refrigeration.

CHILL WITH PAKICE

Vilter Pakicers make crystalline ice as you need it—right on the job. Pakice, pumped to the mixer in proper quantities melts quickly, chills mix fast, really shortens mix time.

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Vilter Supercapacity Water Coolers quickly supply you with great quantities of cold water for mixing or aggregate chilling by inundation.

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Features, a shouldered center pin to prevent plates from spreading under a load.

Drop forged heat treated Hooks, Heads and Links. Steel sheaves grooved to proper line size.

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Box 2496 Tulsa, Oklahoma

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Model 650, D.C. Generator Plant. 500 Watts continuous duty, 650 Watts intermittent duty. Mounted on Model 98 Buggy.

Also Continuous Duty and Emergency Stand-by Plants 20 to 100 KW. (Apply to Dayton for quotations.)

Model 2500, D. C. Generator Plant. 1500 Watts continuous duty, 2000 Watts intermittent duty. Mounted on Model 83 Buggy.

Gasoline Engine Backfill Tamper Catalog No. 699 Revised

Clay and Shale Spade

Asphalt Cutter

Model HP-1 Hot Tamper Plate used with Backfill Tamper

Gas or Electric Turn-A-Trowel Sizes 34" or 48" Catalog No. 939

Gas or Electric Combination Disc Float and Turn-A-Trowel Catalog No. 939

Concrete Surfacing Attachments

Vibratory Concrete Finishing Screed Sizes 6' to 36' Catalog No. 942

Gasoline Engine Driven Concrete Vibrator Catalog No. 783C

Electric Motor Driven Concrete Vibrator. Catalog No. 783C

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Rain and Wet Soil Slow Morganza Embankment

Work Under Way on Control Structure for Mississippi River Flood Diversion in Southern Louisiana

ALTHOUGH rains, and the naturally wet soil used as borrow, are preventing any rapid-fire progress, the embankment-placing phase of the Morganza Control Structure is moving ahead. Grenada Dam Constructors, Inc., of Grenada, Miss., is the contractor on this important part of the big project which is being constructed under the direction of the U. S. Army, Corps of Engineers, New Orleans District.

When completed, the structure will provide a means for controlling the diversion of floodwaters from the Mississippi River into the Morganza Floodway. It will be operated when the flood flow threatens to exceed the safe carrying capacity of the lower river channel. The structure will carry over the floodway the single-track line of the Texas & Pacific Railway, Port Allen branch, and Louisiana State Highway 30. The estimated total cost of the Morganza Control Structure is \$20,500,000. It is expected to be ready for operation in 1953.

The embankment contract held by Grenada Dam Constructors, Inc., is for \$1,626,591, and includes the placing of 3,985,000 cubic yards of semicompacted embankment. Work got under way on the dirt-moving operations in June, 1949, and is expected to be finished in June, 1951. Because of the rainy weather and the high moisture content of the material being moved, a full month's work was a rarity on the job. These conditions often caused the big fleet of equipment to lie idle several days in a row.

Flood-Control Structure

The flood-control structure is located in Point Coupee Parish about ½ mile northwest of the town of Morganza on the right bank of the Mississippi. It extends in a northwesterly direction parallel to and left of the railroad and state highway, stretching from the east to the west guide levee of the Morganza Floodway. The floodway, from 5 to 10 miles wide, lies on the left or east bank of the Atchafalaya River which runs south to the Gulf of Mexico. When completed, the approach embankments in this contract will extend out into the floodway 9,085 feet and 9,645 feet respectively from the west and east guide levees. The control structure itself, to be constructed under a later contract between the approach embankments, will be 3,906 feet long.

Some work had been done on the embankment sections during 1940 and 1941, but World War II intervened, putting a halt to the work. Thus the present contract is enlarging upon the initial construction. The new embankments are downstream or south of the existing railroad and highway; the old and new railroad center lines will be about 200 feet apart. Traffic is being maintained on both arteries of transportation throughout the construction.

Average ground elevation at the site is about 32.0. Elevation of the existing highway averages 35.0, with the elevation of the railroad slightly higher at 35.5. The completed approaches will have an average height of 31 feet above the present ground elevation, a crown width of 75 feet to accommodate the railroad and highway, and a base width of 450 feet. Both the new highway and base of rail for the single-track line will have the same average elevation of 63.13.

On the embankments the railroad and

highway will be 63 feet apart measured on center lines. At the control structure this distance narrows down to 24 feet. The 3,906-foot control structure consists of a concrete weir with 125 bays, each bay having a steel gate, 22 feet 6 inches high x 28 feet 3 inches wide, for regulating the flow of water into the floodway. The concrete structure will be supported on reinforced-concrete foundation piles driven into a firm sand stratum. The gates will be raised and lowered by gantry cranes traveling on

rails supported by the concrete piers at the ends of the bays. The railroad and highway will be carried across the gated bays of the weir on reinforced-concrete bridge decks.

Material Scarce

One of the first moves by Grenada Dam Constructors, Inc., was the clearing of the 410-acre site. The larger trees were cut down by Little Giant Tree Feller self-powered saws. International TD-9 and Caterpillar D6 tractors were used to snake logs and pile debris. Smaller trees were felled with Florida tree dozers mounted on D8 tractors. A 14-foot-wide Ateco rake, pulled by a D8, dressed fill and roads. Altogether 12 D8 tractors were engaged in the construction of the embankments.

Naturally large dirt embankments in this area would cut off ground drainage which flows south down the floodway. So a drainage ditch was dug to catch and divert the water into the floodway through the eastern end of the control structure. The flow is carried under the existing railroad and highway in twin 72-inch corrugated-metal pipe culverts, 58 feet long under the railroad and 82 feet under the highway. The pipe was jacked under the shallow fills so as not to interfere with traffic. The outlet drainage ditch is 8,300 feet long.

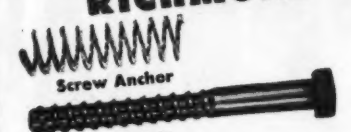
Material for the embankments was not available in any great abundance in the Louisiana lowlands. What there was consisted of clays and silty clays of high water content yet impervious in

(Continued on next page)

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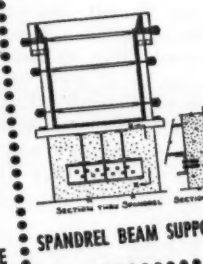
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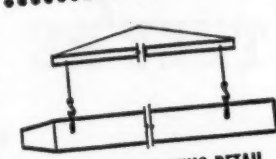
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Rain and Wet Soil Slow Morganza Embankment

(Continued from preceding page)

nature. Two types of material were secured; the less desirable is placed on the long flat berms extending out the sides of the fill to stabilize the embankment, while the better dirt went into the central cross section of the embankment. Side slopes vary with the height from 3 to 1 down to 20 to 1 on the berms.

Most of the dirt for the berms is being taken from the excavation for the foundation structure, and from two borrow pits downstream in the floodway. The average haul with this material is about 750 feet. The rest of the material is coming from three borrow pits, upstream or north of the job, from fields that have been abandoned to cultivation. Haul lengths average from 1 to 1½ miles.

Dirt-Moving Equipment

Dirt is excavated in the borrow areas by three 54-B Bucyrus-Erie 3½-yard draglines and a Model 8 Northwest 3-yard dragline, all having 50-foot booms and Hendrix buckets. Hauling equipment includes 30 bottom-dump Euclids holding 13 yards, and 6 Athey 18-yard wagons; the latter are pulled by D8 tractors. A 2,000-gallon water tank mounted on a Mack truck was on the job for wetting down the fill, but was seldom needed as the material was usually wet when placed. The embankments were built up in 12-inch lifts which were compacted with three passes of a D8 tractor. The specifications called for three passes of a crawler tractor weighing not less than 10 tons and exerting a unit pressure of 6 pounds per square inch.

The abutment sections of the embankments adjoining the future control structure were constructed first in order to have more time for consolidation of material. The east abutment section was placed first, followed by the section at the west end. In this contract the complete cross section of finished embankment will not be constructed. A future contract will include the placing of additional select material on top, after which the railroad line will be shifted to its new location. After the railroad is in place the new embankment will be extended out over the original railroad fill to the edge of the existing highway. In this operation the new approach embankments will be brought up to proper grade and cross section for the relocated highway. The existing highway being north of the existing railroad, motor traffic is little disturbed by the construction.

During the fill work, the haul roads are kept in shape by two Caterpillar No. 12 motor graders. Texaco fuel and oil for the motorized equipment comes from Baton Rouge, La., in transport trucks. On the job are two 12,000-gallon storage tanks for fuel, and another tank holding 4,000 gallons and mounted on a skid frame that can be shifted easily over the job. Equipment is also fueled during working hours from a 1,200-gallon tank truck. When weather permits, dirt is moved on a 16-hour basis. Two Caterpillar light plants are put in service then on the fill.

A sheet-metal repair shop was set up by the contractor just north of the existing highway. Equipment is usually greased right out on the job by Lincoln grease rigs; one of these is carried around by a Mack service truck, while the other is mounted on skids and is pulled by a tractor.

Quantities and Personnel

The major items in this floodway-embankment contract include:

Clearing	410 acres
Grubbing borrow areas	243 acres
Preparation of embankment foundations	134 acres
Corrugated-metal culvert, 72-inch	252 lin. ft.
Semiconpacted embankment	3,985,000 cu. yds.
Seeding embankment slopes	390,000 sq. yds.

Grenada Dam Constructors, Inc., employs an average force of 60 on the project under the direction of J. L. Phillips, Superintendent, with O. D. Cross and J. T. Vines as Foremen.

For the Corps of Engineers, Martin G. Chitty, Field Assistant at Baton Rouge, has field supervision of the work. John W. Harris is Project Engineer and Alton R. Kent is Assistant Project Engineer. The New Orleans District is headed by Colonel Charles G. Holle, District Engineer.

The casting and driving of concrete foundation piles for the control structure is now under way under a contract with Raymond Concrete Pile Co. Bids for the superstructure were opened in July, 1950. The remainder of the dirt work for the embankments will be covered by subsequent contracts.

When completed, the Morganza Control Structure can divert Mississippi River floods through the levee along its right or west bank into the floodway at the rate of 600,000 cubic feet each second. (Concluded on next page)

White Kerosene Torches For Many Heating Uses

White torches are widely used by contractors, highway departments, railroads, general industry. They are heavy duty units for dependable heating and melting.

They warm materials; melt snow and ice; thaw frozen pipes and machinery; loosen frozen car hoppers; burn weeds and refuse; preheat for welding; start foundry fires. Many uses where clean voluminous flame is wanted. Produce 1600 to 1800° F. Model C-1, below, is only 3 gal. hand torch which burns entire fuel supply horizontally or vertically. Hose connected torches, with 5, 15, 20 gal. heavy steel tanks. Burn 3 to 5 gal. per hour. Also with 2 burners, or on wheels. Round pot burner for kettles. G-1 atomizing burner for high temperatures, with comp. air.

Note: Amount of heat is determined by quantity of fuel burned—not by length of flame.



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Built to slug it out on the toughest jobs, HENDRIX DRAGLINE BUCKETS are engineered to give dependable, economical performance that pays off in profitable operation. Hendrix Buckets are scientifically designed for maximum digging capacity... built for smooth, easy operation. And Hendrix Dragline Buckets can take the toughest punishment and come back for more!

If you're up against a difficult job, get a HENDRIX... built to take it and built to give you low-cost performance that means more profits.

3/8 TO 40 CU. YDS.

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EVERY DIGGING PURPOSE

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ond. The Bonnet Carre Floodway, above New Orleans, has a capacity of 250,000 cfs which it discharges easterly into Lake Pontchartrain when it is placed in operation. Other resources to divert Mississippi floods include the West Atchafalaya Floodway with a capacity of 250,000 cfs, and the Atchafalaya River itself which can handle 650,000 cfs. Below New Orleans the river channel of the Mississippi will carry 1,250,000 cfs. Together these add up to 3,000,000 cfs which is the discharge that might be expected when maximum floods on the Mississippi and its tributaries occur at the same time. Thus the Morganza construction is designed to skim off part of any river flood headed toward New Orleans and of such magnitude as to threaten to overtop the levee.

Two New Earth-Movers

Production of two new earth-moving machines is announced by Caterpillar Tractor Co., Peoria, Ill. They are a 4-wheel diesel tractor-wagon combination, the Cat DW20 tractor with a W20 wagon; and a 2-wheel diesel prime mover, the Cat DW21, equipped with the No. 21 scraper. These two new machines are designed as an equipment package to meet specific needs in each zone of operation. The 4-wheel DW20 tractor will also be available with a No. 20 scraper and a No. 20S bulldozer. The new No. 27 rear double-drum cable-control unit will be offered to operate the bulldozer.

Both the DW20 and DW21 prime movers have the new 6-cylinder Cat diesel engine rated at 275-hp peak capacity at 2,000 rpm, with 225 hp at 1,900 rpm available at the flywheel. The new engine has a 5½ x 6-inch bore and stroke with 743-cubic-inch piston displacement. A governor is provided to control low idle speeds and to prevent overspeeding of the engine. All working speeds are controlled by means of a foot throttle. Each unit has the Caterpillar constant-mesh spur and helical-gear transmission, pressure-lubricated, and a 16-inch-diameter double plate clutch with semimetallic friction surfaces. It is foot-operated with an air power booster. An independent 2-cylinder gasoline starting engine with a simple 6-volt electric starting system is provided as standard equipment.

The DW20 4-wheel tractor has five forward speeds ranging from 2.88 to 26.60 mph and one reverse travel speed of 3.72 mph. The 4-wheel tractor has a wheelbase of 128 inches; with the wagon, overall length is 45 feet 8 inches. The wagon has a struck capacity of 17.0 cubic yards and a heaped capacity of 25 cubic yards. The bottom-dump doors are hydraulically controlled with a positive mechanical lock. Off-the-road traction-type tires are standard for both tractor and wagon. Front tractor tires are 20-ply 14.00 x 24, and rear tires, interchangeable between drive and wagon wheels, are 24-ply 24.00 x 29. The tractor-wagon combination has an 8-foot 6-inch tread width.

The cable-controlled No. 20 scraper has a struck capacity of 15 cubic yards



The Caterpillar DW21 and No. 21 scraper equipment package. The prime mover has the new 6-cylinder Cat diesel engine, which delivers 275-hp peak capacity at 2,000 rpm, with 225 hp at 1,900 rpm available at the flywheel.

and a heaped capacity of 19½ cubic yards. With 12-inch sideboards, the struck capacity is increased to 18 and the heaped (based on a 1 to 1 slope) is increased to 22½ cubic yards. The No. 20S bulldozer will have a blade

length of 12 feet 6 inches and a height of 47 inches. It will be available only as a cable-controlled unit, utilizing the new No. 27 rear double-drum control.

The 2-wheel DW21 tractor has five forward travel speeds which range from

2.16 to 20.0 mph, and a reverse speed at 2.79 mph. Overall length of the tractor-scraper combination is 40 feet 7 inches, and the wheelbase is 24 feet 7 inches. Bar-tread tires, interchangeable between tractor and scraper, are 24-ply 24.00 x 29.

Positive hydraulic follow-up steering, 90 degrees each way, permits a non-stop turn with the scraper in 35 feet. Load capacities of the cable-controlled No. 21 scraper are the same as those of the No. 20.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 119.

Smart Now Heads Gurley

Charles E. Smart has been elected President of W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering and surveying instruments. Mr. Smart succeeds C. I. Day, who died in June. Lester C. Higbee, General Sales Manager, has been elected Secretary to replace Mr. Smart.

GULF PRODUCTS and FINE SERVICE

*keep equipment rolling
on Pennsylvania Turnpike Eastern Extension*



Frank Mashuda Company, Milwaukee, Wisconsin is the general contractor on Section 21-A of the Eastern Extension in Cumberland County, Pa., which includes the job of connecting the new highway with the existing Turnpike at Middlesex. The photo below shows the nearly completed link with the clover-leaf under construction. The road to the left in the photo is part of the new Extension, and that to the right is part of the existing Turnpike.

FRANK MASHUDA Company is one of a number of leading contractors on the Pennsylvania Turnpike Extension who find that the use of Gulf products is reflected in better operating records for equipment.

Always of the same uniform high quality, Gulf lubricants and fuels work as a team to help contractors do a speedier, more profitable job. Gulf lubricants provide an extra margin

of protection to equipment under all types of operating conditions—and Gulf fuels insure maximum engine power and efficiency.

Write, wire, or phone your nearest Gulf office today and arrange to use Gulf Quality Lubricants and Fuels on your next job. They are quickly available to you through more than 1200 warehouses in 30 states from Maine to New Mexico.

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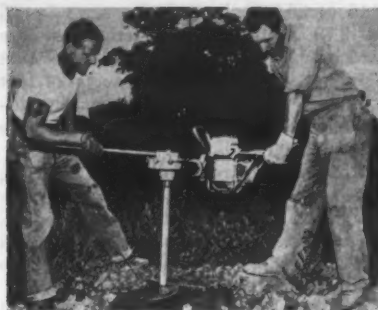
¾ TON WINCH

This Hand Winch is ideal for moving and installing heavy machinery, loading trucks, hand derricks, cranes, gin poles, loading logs, sawed lumber, loading implements on trailers, hoisting silage, pulling wells, etc. Can be bolted anywhere and operated in any position. Made of electric steel; bronze bushed; 2 speeds, 8.16 to 1 for heavy loads . . . 3 to 1 for fast operation . . . self locking to hold loads at any position.

Overall Dimensions 12½ in. x 7½ in. x 7 in. Handle 10 in. long. Drum size 3 in. dia. x 6 in. long x 6 in. dia. flanges. Will hold 100 ft. ¼ in. Wire Rope. Illustrated with 50 ft. ¼ in. Wire Rope. Shipping Wt. 87½ lbs. **STANTON**—Five-day return privilege.

\$39.50 WITH 50 FT. OF ¼ in. WIRE ROPE
Send remittance with order and we prepay postage. If your distributor doesn't have it for literature and information write:

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1618 S. Osage St., Dept. CE, Independence, Mo.



Digging a 6-inch post hole 30 inches deep takes less than 15 seconds in any earth with the new Earth Drill, says McCulloch Motors Corp. The unit converts into a standard McCulloch chain saw in less than a minute.

Earth Drill Converts Easily to Chain Saw

A new 5-hp gasoline-powered post-hole digger that can be converted into a standard McCulloch chain saw in less than a minute has been announced by McCulloch Motors Corp., 6101 W. Century Blvd., Los Angeles 45, Calif. Since the engine on the new Earth Drill is the same as that used on the timber saw, conversion is made by detaching the drill assembly and attaching a chain-saw assembly. The unit is completely portable, requiring no tractor or vehicle for its operation.

Weight of the two-man Earth Drill complete with 6-inch auger is 79 pounds. A full-swivel coupling at the engine permits the auger to drill at any desired angle, and makes it possible to reverse the rotation of the auger if desired. Other features are a centrifugal clutch that automatically disengages the auger at idling speeds; kickproof automatic-rewind starter; diaphragm carburetor to permit full-power engine operation in any position; and one-control operation.

Augers 6, 9, and 12 inches in diameter are available. The Earth Drill is sold either as a complete unit or as an attachment for Model 5-49 or 1225 McCulloch chain saws already in use. Chain-saw attachments for use with the Earth Drill, with blades from 20 to 60 inches, can also be obtained separately.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 37.

For Brake Relining

A new heavy-duty power brake-relining machine for work on trucks, tractors, and other construction machinery has been announced by Star Machine & Tool Co., 201 Sixth St., S. E., Minneapolis 14, Minn. The Star No. 80 will handle all series of rivets including the No. 10, 1/2-inch or larger head, and 1/4-inch shank. It will rivet and derivet large tubular rivets, the company says.

All riveting is accomplished by power. A foot-trip treadle engages the clutch and power is furnished by a 50-pound flywheel and 1/3-hp electric motor. The single motor operates the riveter, countersinker, and grinder.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 94.

Tractor Attachments

A series of new circulars covering attachments and accessories for International TD-6, TD-9, TD-14, TD-18, and TD-24 tractors, has been prepared by Isaacson Iron Works, Inc., 2917 E. Marginal Way, Seattle 14, Wash. The equipment includes hydraulic angle and straight-blade dozers with front power takeoff, cable-operated angle and straight-blade bulldozers with front or rear cable control unit; single-drum Winchoists; single and double-drum cable control units; Karry-Kart for logging light timber, Karry-Arches for logging heavy timber, scrapers, rippers, brush-cutter blades, and sheeps-

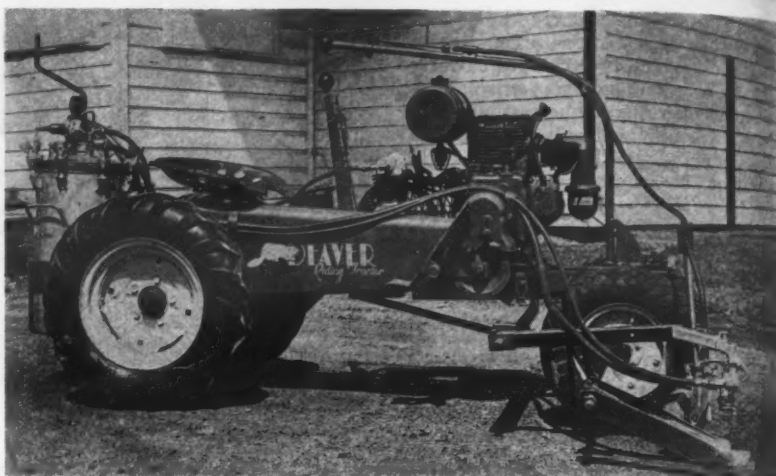
foot and pyramid-type-foot rollers.

This literature may be obtained from Isaacson Iron Works by indicating the particular product you are interested in, and the tractor it is to be used with.

Traffic-Line Marker For Intricate Work

A new 6-hp riding-type tractor with special equipment and attachments for road striping has been introduced by Beaver Tractor Co., Inc., Stratford, Conn. Operated by the driver, the machine pressure-feeds paint from a 5-gallon tank through a spray gun.

The machine can be loaded on a small truck—with road markers, flags, paints, and other apparatus—and transported to the job. Once it is set in motion, all action is automatic, the company says. The rider need only steer along the route required. The tractor is geared to travel from 5 to 6 mph. The manufacturer points out that the maneuver-



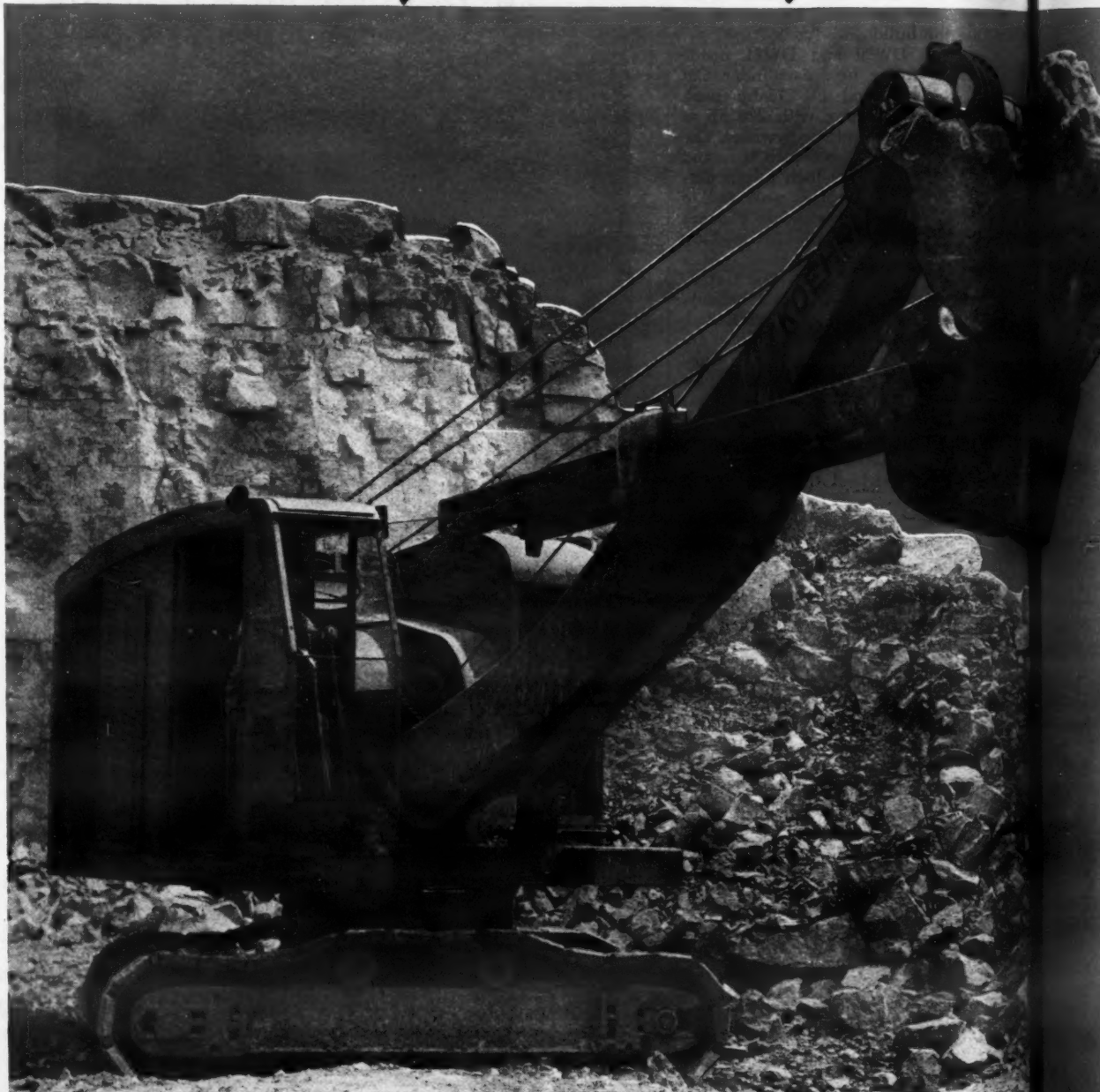
The new Beaver road-marking machine is equally efficient for straightaway road work, or in-town work on cross walks, safety zones, and parking areas.

ability of the unit permits its use for marking parking lines, safety zones, and other intricate work formerly done by hand machines, in addition to high-

way and street-striping operations.

Further information may be secured from the company. Or use the Request Card at Page 16. Circle No. 56.

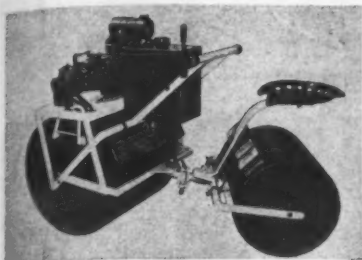
When you compare



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A new water-tank assembly equips the 1/2-ton Motoroller for compacting bituminous surfaces.

Water-Tank Assembly For Half-Ton Roller

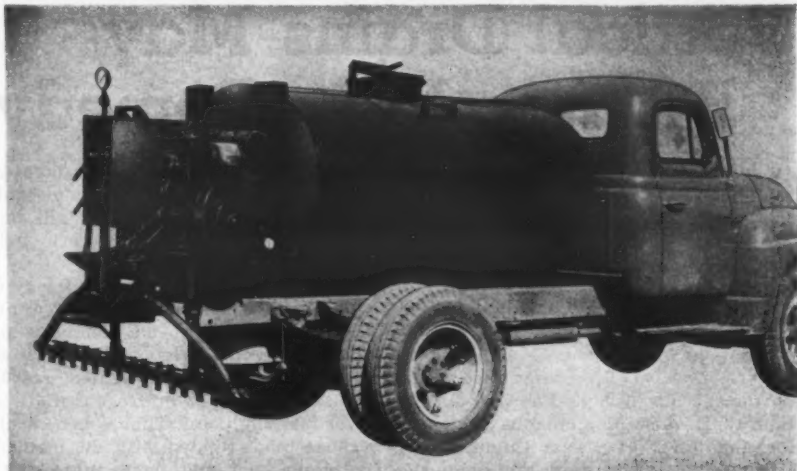
A water-tank assembly for the 1/2-ton Motoroller has recently been developed by the Gabb Mfg. Co., Windsor Locks 8, Conn. The Motoroller, designed for patching roadside development, and landscape work, can now be equipped with a water tank, spraybars, and cocoa mats for use in compacting bituminous road surfaces. The water-

ing assembly wets the drum roll to prevent adhesion of hot blacktop material. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 89.

A New Distributor For the Smaller Job

A new maintenance distributor, the Model RHU, which is available in 600, 800, and 1,000-gallon capacities, has been announced by Rosco Mfg. Co., 3118 Snelling Ave., Minneapolis 6, Minn. Designed for mounting on trucks of 1 1/2-ton capacity or more, this unit will supplement Rosco's line of larger distributors.

A general-purpose unit for handling all types of bituminous materials, Model RHU is equipped with a detachable nonfolding stationary spraybar in lengths governed by pump capacity. Burners and power unit, including a 100-gpm rotary pump, are all compactly mounted at the rear. This unit



The Rosco Model RHU 600-gallon maintenance distributor mounted on an 84-inch cab-to-axle truck. The Style C full-circulating spraybar is shown, also the special operator's step at the rear of the unit.

is designed to maintain a constant sprayline pressure through use of a bypass valve to the tank. The machine's

operations include load, transfer, spray, handspray, circulate, spraybar suck-back to clear spraylines, cleanout, and gravity drawoff.

Further information may be secured from the company requesting Bulletin S-170 A. Or use the Request Card at page 16. Circle No. 100.

New Portable Dredge Made For Quick Moves

A new hydraulic pipeline dredge, designed for extreme portability, for shipment by truck or rail, has been developed by Ellicott Machine Corp., 1611 Bush St., Baltimore, Md.

The Little Dragon, as it is called, is capable of digging to depths of 20 feet below the surface of the water and has a rated output of 50 to 150 cubic yards per hour, depending upon operating conditions. The 40 x 18 x 4-foot hull is built in five sections, each self-buoyant, and can be easily assembled on land or in the water, using simple bolted connections. All principal machinery items are mounted on the large center hull pontoon. It is necessary to remove the structural frames, dredging ladder, sectionalized deck house, and the four-side pontoons, which provide stability and buoyancy, to transport the unit to a new dredging site.

The Little Dragon is designed to meet the requirements of a small, efficient dredge for general construction work, deepening reservoirs, stream-pollution control, and waterfront and real estate improvement.

Bulletin No. 804 describing this dredge may be secured from the company. Or use the Request Card at page 16. Circle No. 118.

Screening and Washing

An 8-page catalog on Diamond screens and washers has been prepared by Diamond Iron Works, Inc., 18th Ave. and N. 2nd St., Minneapolis, Minn. It outlines the construction and operation features of the balanced vibrator, and gives complete specifications on the rotary scalping screen and the combination scalping and scrubbing screen. These units are available in capacities up to 150 cubic yards per hour for 8-foot lengths. The catalog also lists features and specifications of the Diamond drag washer and shaker screen.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 15.

Plant for Flexible Tubing

Flexible Tubing Corp. will move into its new 13,000-square-foot brick and steel plant in Guilford, Conn., on November 15. The plant is on a large tract of land on Whitfield Street, south of the New Haven Railroad right-of-way. Flexible Tubing Corp. manufactures Spiratube, a flexible and retractable ventilating and products conveyor.

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7 3/4 to 79 1/2 TONS lift capacity . . . 1/4 to 2 1/2 yards dipper capacity

Vertical Drains May Be New Frost Remedy

A Drill Bores Holes Through Frost Zone; Salted Gravel Is Then Installed to Lower the Freezing Point of Subgrade

✦ FROST boils . . .
Or frost heaves . . .

Whatever you want to call them, they're the No. 1 spring enemy of northern roads. Nobody knows it better than W. H. Root, Maintenance Engineer for the Iowa Highway Commission. During his 38 years in the highway business, Root has frowned and cursed frost damage as much as anybody. Today he can smile when he tells you about Iowa's remedy.

He had a little I-think-we've-got-it-whipped grin on his face when he

swiveled around in his chair, pointed to a picture of a drill crew, and said, "Don't play it up as a cure-all, but this thing is working out very well under many conditions."

What Root was referring to was a special drill which bores vertical drain holes, and an improved technique of installing seep outlets. The vertical drains, filled with salt-treated gravel and sand, give the entire subgrade a lower freezing point. That is beneficial, because roads treated with the method freeze up later and thaw out earlier. The moisture also has a place to go.

The present technique is an improvement on an original method started about 15 years ago. There was a time when a man on the drain crew had to have a pair of shoulders like a bull, because drilling was a hand-auger affair. Then some light power drills, of the type used by farmers for installing fenceposts, were bought. They didn't stand up. You don't dig bituminous mats and rock subbases with the auger on a can opener.

Several years ago, Cardox-Hardsoc Co. of Ottumwa, Iowa, developed an exploration drill for rock work. One of Iowa's contractors, the Kaser Co., used one of the machines on a job and tipped off the highway men that it was powerful and sturdy enough to stand punishment. The Commission authorized the purchase of one such custom-built unit, made to Commission specifications. The method and technique revolves largely around this drill.

It is mounted on a small self-propelled unit. The drill bit, driven by a V-8 engine, is a simple screw-type auger with removable cutting edges. Up-and-down travel for the 6-foot stroke is hydraulic. In ordinary earth, the machine has no trouble digging 300 holes in 9 hours, and extreme high performance for a 6-foot 7-inch-diameter hole has been one per minute.

How does it work? Let's see.

Grid-Hole Pattern

Any section slated for the vertical-drain treatment is laid out in a 5-foot grid. A job typical of that done over the state was in progress on State Route 191, between Portsmouth and Neola, in the western part of the state, when this magazine visited the Maintenance Bureau.

It was a 12-foot road. It was laid out in the same pattern in which other jobs are drilled. A row of holes at 5-foot



C. & E. M. Photo
A Hardsoc drill (in background) bores a row of 7-inch holes down Route 191. Then Iowa maintenance men run a thin layer of gravel from this truck into the bottoms of the holes—a step in their battle against frost boils.

centers was drilled on the center line. There was a row on the same centers at the quarter points, and a row along each edge.

Drill Center Line First
The center-line row was drilled first, followed up with a return trip down
(Continued on next page)

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NEW LOW PRICES**

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USTRAC is now priced lower than ever before. Pound for pound and—inch for inch it is the best tractor buy on the market.
- ✓ **MANEUVERABLE . . .**
Ruggedly constructed—designed for heavy-duty work. Only 37-inches wide, USTRAC is perfect for confined areas.
- ✓ **FOUR SPEEDS-INSTANT REVERSE**
USTRAC has four forward and reverse speeds instantly selected by lever eliminating unnecessary stopping. Exclusive USTRAC feature.
- ✓ **INEXPENSIVE TO OPERATE . . .**
Owners report fuel consumption of dependable Continental engine under \$1.50 per day.
- ✓ **EQUIPMENT . . .**
Finger-tip hydraulically controlled front end loader with bucket capacity of 1/3 cubic yard, angle dozers, bull dozers, etc., available with quick, easy one-man attachments. Easily works 14" three-bottom plow.

CLARK PARTS AVAILABLE . . .

The Clark Airborne—the tractor used by Seabees and Army engineers during the war—was the forerunner of the USTRAC. Many parts are interchangeable. If you need Clark parts check with The Federal Machine & Welder Company, Warren, Ohio.

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EXPORT: 149 Broadway, New York



C. & E. M. Photo

After salt water has been placed in a drain hole, and the hole filled with gravel, this vibrator man works on the material to distribute the salt throughout the hole.

the quarter point of one half, and another trip up the edge row. During this time the highway remained open to traffic.

The first row of holes was carefully spaced with a marked line. After it had been drilled, the drill operator simply matched the distances of previously drilled holes, and where he stopped his machine the drill operator quickly punched a hole. With the exception of the daily replacement of the two cutting edges on the auger bit, the machine required very little maintenance.

As the drill finished augering the holes and the operator removed the bit, one man with a shovel scooped the excavated dirt away, leaving the ground around the top of the hole clean. Two dump trucks, a Ford and an International KB-5, then backed in with loads of gravel their operators had loaded with an I-6 International tractor and Hough loader. According to men in charge of this work, any good, well graded, clean gravel will do the trick. The gravel for this job contained a visible quantity of sand, and the top particle size was about 2 inches.

The trucks each had a special V-shaped removable tailgate, with a manually operated sliding gate. As the truck backed over each hole, the tailgate man let about 18 inches of material fall to the bottom of each.

A salt-water solution was then applied. The rig for this work consisted of a truck-mounted 550-gallon water tank with a gravity valve-operated feed pipe. A small centrifugal pump permitted the truck to load itself in the nearest stream. The salt solution was mixed in a steel drum suspended from a framework on the back of the truck.

The solution contained 2.5 pounds of common salt per gallon of water, or 3.25 pounds of calcium chloride (1 sack to 30 gallons of water) for the same amount. Laborious hand stirring had been discarded, and the men had rigged up a small stirring paddle driven by a Briggs & Stratton gasoline engine. Mixed solution passed through a manually controlled hose to a measuring bucket. From 3 to 3½ gallons of this solution was then dumped over the bottom gravel in each hole.

Quickly, then, one of the gravel trucks backed over the holes and the tailgate man ran them full of gravel. A man with a gas-driven Marvel vibrator followed. He probed the vibrator point to the bottom, and the high vibra-

tion consolidated the gravel and brought the salt solution up through the entire drain. Theoretically this solution should probably leach out, but actually it appears to saturate the subgrade slowly all around the holes.

Surplus dirt brought up by the drill was removed to the shoulders by an underbody grader blade mounted on an Oshkosh truck. That completed the operation.

So far as the crew was concerned, there was a foreman, a drill-machine driver, a drill operator, a laborer to clean excess dirt away while drilling, 2 men on the salt truck, 2 truck drivers on the gravel haul, a tailgate operator, and a vibrator man. The State Route 191 job was costing approximately \$1.00 per hole, or in this case, \$1.00 per linear foot of highway.

Unusual Surface Treatment

We might digress for a minute because of a somewhat unusual surface treatment which the Commission has planned for the Portsmouth-Neola



C. & E. M. Photo

An underbody blade on an Oshkosh truck removes surplus dirt brought up by the drill.

road. Formerly, a bituminous surface on an inadequate base, its maintenance was sky-high. A year or so ago the Maintenance Bureau actually scarified it and turned it back into a gravel road.

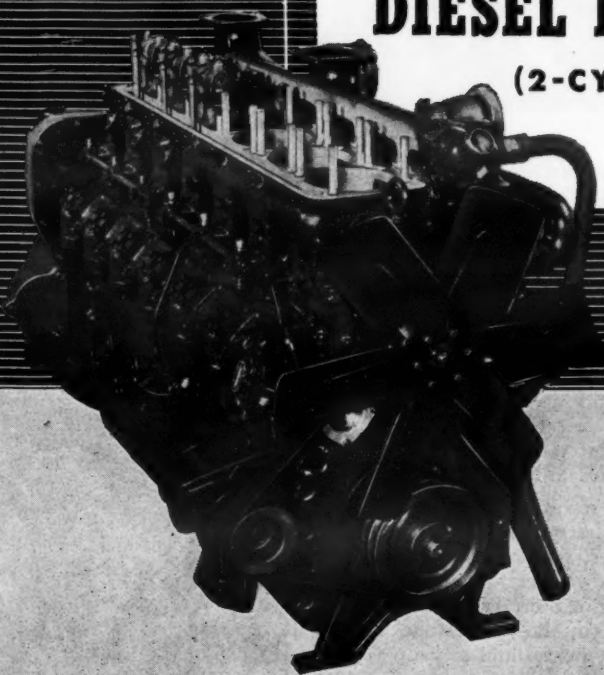
Don't think there weren't howls that were heard all the way to Ames!

When the vertical-drain installation is finished, the Commission plans to rescarify the road surface. The old

(Concluded on next page)

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PORT WASHINGTON WISCONSIN, U.S.A.

Vertical Drains May Be New Frost Remedy

(Continued from preceding page)

material will then be carefully shaped and re-laid with sheepsfoot and pneumatic rollers. It will be tight-bladed then until it is polished smooth.

The excess dust and fines will then be power-broomed to one side, and about 0.4 gallon of Socony-Vacuum Oil Co.'s new Dustrol preparation will be applied as a surface treatment. According to some of the engineers in the Commission, early demonstrations of this product indicated some promise for the material. It makes a live dust-free surface. With the subgrade strengthened by the vertical drains, it is believed that the road will be much better.

Drill Works Statewide

The Iowa Highway Commission works its drill over all the state, usually from April 15 to November 15. In the winter it frequently does sampling. A set of standard instructions in the vertical-drain technique has been made up, including pointers on drill operation, and a district crew is assigned wherever the drill goes.

The machine has worked over the entire state in clay, sand, gravel, shale, sandstone, and various soils.

Possibly the best indication of the success of the drain technique is the fact that many roads which formerly needed planking, or corduroy treatment, now stand up fine under traffic when the spring frost heaves are in season. It has definitely reduced the frost damage practically everywhere it has been tried.

On the other hand, there have been a few places where for one reason or another it didn't work as it had been planned.

They were making a final inspection of one job that had been drilled some time before, and a bituminous deck put on. The automobile dipped and rumbled over the many small dish-shaped places in the blacktop, which had developed because the gravel hadn't been compacted thoroughly.

"Ten million cats! Head to tail, every one of 'em!" screamed one of the head engineers.

The local maintenance man looked him up and down carefully, as if he thought the critic needed a psycho.

"If it would come a shower of milk I could feed 'em all! You left enough saucers behind in this job!"

Maybe that's what Root had in mind when he said it was not exactly a cure-all. The difference between curing and killing, in many cases, is in the care with which treatment is applied.

Make Your Own Drag

Spring-steel-wire drag brooms in any length up to 12 feet may be obtained from the Van Brush Mfg. Co., 327 Southwest Blvd., Kansas City, Mo. The company points out that with these units, assemblies may be made to any shape desired and used for seal-coat or asphalt surface-treatment work. The units are constructed of hardwood lumber 6 inches wide, with 8 holes across filled with three tufts of heavy-gauge steel-spring wire folded over and protruding 5½ inches out of the block.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 67.

Reprint on Stud Welding

A 16-page illustrated booklet which reprints the chapter on stud welding from the third edition of the "Welding Handbook" is available from the Nelson Stud Welding Division of Morton Gregory Corp., Lorain, Ohio. The handbook was prepared by the American Welding Society; chapter 14, now reprinted, explains the stud-welding method of fas-

tening, describes the equipment and its principal uses, and gives stud locating procedures and other data. Cross-section and micro-section photographs illustrate metallurgical aspects of this process. Tables provide data on the mechanical properties of stud-welded joints under both tensile and impact tension tests.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 95.

How Sand Drains Work In Stabilizing Wet Soil

A simple and economical way to stabilize soft marshy ground on which a road, airport, or earth dam is to be built is described in a folder recently prepared by McKiernan-Terry Corp., 15 Park Row, New York 7, N. Y.

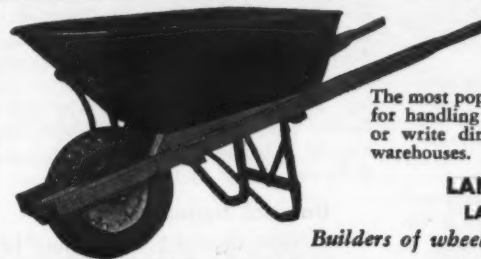
The folder explains how this sand-drain method was originated by O. J. Porter of Sacramento, Calif. It refers to successful applications throughout the United States and offers a bibliog-

raphy of job reports. It explains how the vertical sand drain works and the equipment required to install it.

Among the illustrations are diagrams of the action of the sand-drain method and photographs of sand-drain rigs in operation, including McKiernan-Terry pile hammers, compression leads, and specially designed skips used on recent jobs. The bulletin claims that this method is 20 to 80 per cent cheaper than

other ground-stabilization methods where depths range from 10 to 100 feet. It points out that the use of sand drains results in settlement of the underlying silt to a point of firmness in a year or two, as compared to an expected natural settlement period of perhaps 50 years.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 34.



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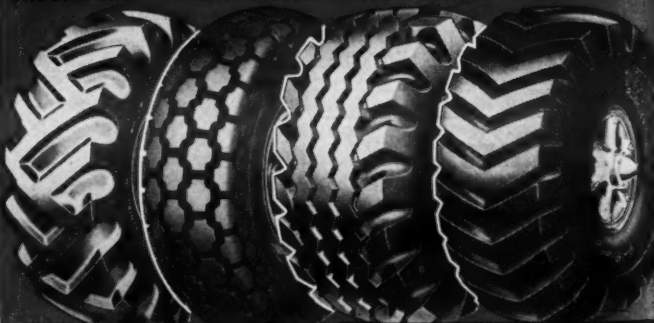
The records of off-the-highway operators the country over prove this, and you can prove it too by giving Firestone Tires a trial on your equipment. Let your Firestone Dealer or Store give you all the facts and show you how Firestone Tires will cut your expenses and step up your profits.

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Left, the Model 7170-R Alemite high-pressure 25-pound electric power gun for light and medium greases. Right, the Model 7175-R 40-pound gun for all types of greases.

Electric Power Guns To Feed Lubricants

Two new high-pressure electric power guns, for feeding lubricants where air power is not available have been announced by the Alemite Division of Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill.

The 25-pound gun, Model 7170-R, will deliver 14 ounces of light or medium lubricant per minute at 70 degrees F. It will handle all greases that seek their own level, and develop 5,000 pounds of pressure, the company says. It has a 115-volt 60-cycle universal motor, with a heavy-duty switch which automatically shuts off the motor when 5,000-pound pressure is built up. It is complete with 7 feet of 1/4-inch high-pressure hose, ball-bearing Z-type swivel, and control valve. Rear wheels are 8 inches in diameter, the front wheel is 4 inches, and they are available in rubber or steel.

The 40-pound gun, Model 7175-R, is designed for all types of grease, fibrous, heavy, or light. It has a helix arm and worm-gear priming, and delivers 5 1/2 ounces of heavy fibrous lubricant per minute at 70 degrees F. It develops 5,000 pounds of pressure and has the same type of motor and switch as the Model 7170-R. It is supplied with 10 feet of 3/8-inch-ID high-pressure hose, ball-bearing Z-type swivel, and control valve. It is available with 8-inch rear and 4-inch front wheels, of steel or rubber, or with 8-inch front and 16-inch rear wheels of steel. Where stationary or truck mounting is desirable, the Model 7175-R is available without the wheel and hose assemblies.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 48.

Portable Asphalt Plant

A new bulletin on the Model 101 bituminous plant has been issued by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn. The Model 101, largest of the Continuflo plants, has a rated capacity of 110 to 135 tons per hour.

The bulletin explains portability, production, and performance features of the plant. A 3-page cutaway drawing illustrates how the material flows through the plant in the continuous process. The Model 101 is made in three main units mounted on pneumatic tires. The mixer, transfer elevator, gradation screen, and bin are on one chassis; the dryer is on the second chassis; and the dust collector is on the third. Power for operating may be electric, diesel, or a combination of diesel-electric, the catalog explains.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 7.

Blaw-Knox in Wire Bldg.

The Blaw-Knox Co. has moved its Washington, D. C., office from the Munsey Building to Suite 209, Wire Bldg., 1000 Vermont Ave., N. W. Marvin Marcus is the Manager of the office.

Roadside Development Papers Are Published

The active phase of Ohio's Ninth Short Course on Roadside Development comes to a close with publication of the papers presented at that meeting last March 22 and 23.

All the paper presented, developing the general theme of "The Complete Highway", and covering such subjects as appearance, safety, and maintenance, are included in the booklet for rereading.

The itinerary for the inspection trip appears in the back of the book with appropriate maps and pictures. A complete registration list is included.

To secure a copy of the proceedings, address Professor Charles R. Sutton, Department of Architecture and Landscape Architecture, The Ohio State University, Columbus 10, Ohio, or Wilbur J. Garmhausen, Chief Landscape Architect, Ohio Department of Highways, Columbus 15, Ohio. Copies are free.

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- ★ Each unit built to job requirements.
- ★ Available in sizes and lengths to meet all bridge and axle laws.
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- ★ Dumping mechanism FOOL-proof—trouble-FREE!
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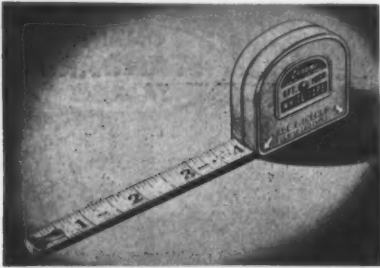
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A self-actuating brake that cannot scratch or wear off markings is a feature of the Evans White-Tape.

White Builders' Tape

A new white steel measuring tape for builders is made by Evans & Co., 57 Branford St., Newark 5, N. J. Available in 6, 8, and 10-foot lengths, the White-Tape rule is finished in bonderized white enamel with black markings and graduations baked into the enamel base. The tape is white on both surfaces and is graduated on both edges of the top surface.

The chrome-plated case is flat on the bottom and has straight sides to permit quick-reading inside and outside measuring. The tape glides freely in and out of the case but is clamped at any position when it is released by a self-actuating brake, Evans says. This braking device will not scratch or mar the tape since it does not touch the surfaces. Replacement blades can be inserted without taking the case apart.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 75.

New Flex-O-Lite Building

The Flex-O-Lite Mfg. Corp., 3130 Chouteau, St. Louis Mo., manufacturer

of reflective glass beads, is erecting a plant and office building in St. Louis County. Total floor area of the installation is 17,500 square feet and the cost will be approximately \$150,000.

Magnetic Nail Holder

Lathers, carpenters, roofers, and others who drive short or stub nails often need a nail holder to get into ordinarily inaccessible spots. The new stub-nail holder manufactured by the T. B. Miner Tool Co., 16254 Hesperian Blvd., San Lorenzo, Calif., has a magnetic tip to simplify the job. When picked up by the head, the nail will usually point itself.

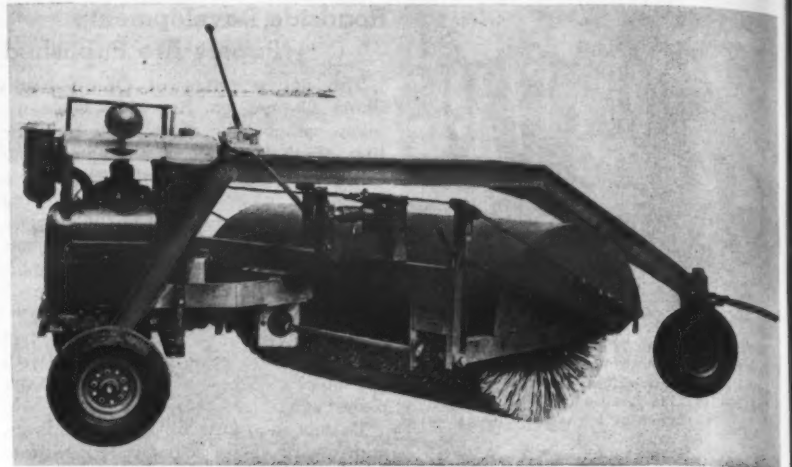
The tool proper is made of tough nonmagnetic metal designed for hard use. The heat-treated alloy-steel insert is energized by an Alnico V magnet. The company points out that the tool will be remagnetized without charge if it loses its gripping power.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 129.

New Trailer Sweeper

A new engine-driven trailer sweeper is announced by Little Giant Products, Inc., Peoria, Ill. It can be used for cleaning subsurfaces before applying asphalt on new roads, clearing snow off airport runways, or just keeping that dirt shoulder off the road. The frame has three wheels and the brush is powered by a 15-hp Wisconsin air-cooled engine. Built for operation by one man, the sweeper can be towed behind a truck, pickup, or any other piece of rubber-tired equipment.

The sweeper brush is available in 6, 7, 8, and 9-foot lengths. All have a 32-

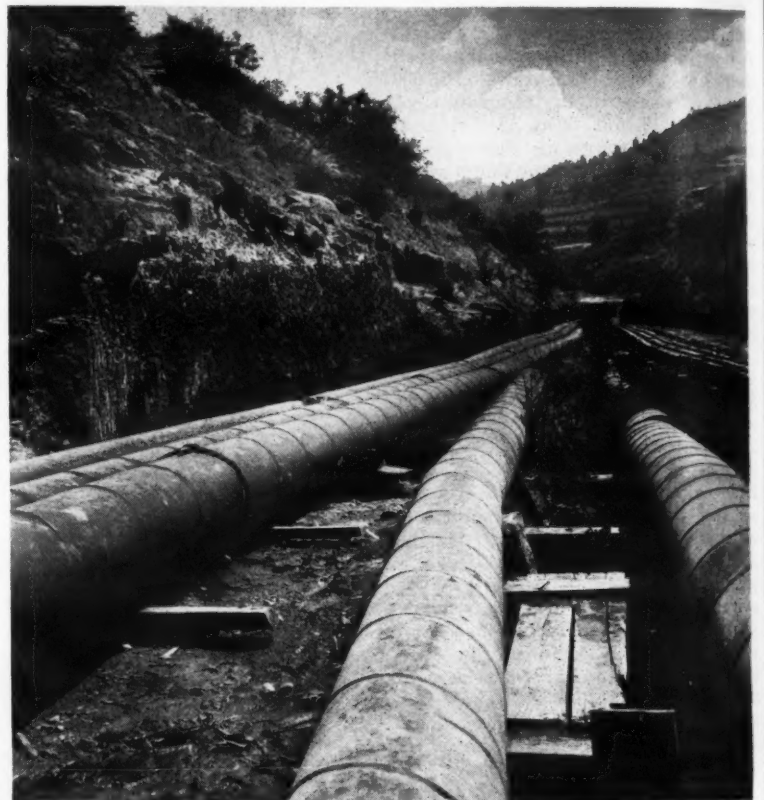


A 15-hp air-cooled engine powers the Little Giant trailer sweeper for airport and road construction use. Brushes are available in from 6 to 9-foot lengths.

inch diameter. The frame is made of 4-inch structural channels supported by 18 x 5.55 six-ply balloon tires. The unit has an overall length of 11 feet;

overhead clearance is 4½ feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 111.



WATER BOY... 1950 Model

When it comes to handling water, you can depend on Naylor Pipe to do a better job.

Naylor's light weight makes it easier to handle and install. The extra strength of Naylor's exclusive Lockseam Spiralweld structure makes it safer and tougher—superior to ordinary lightweight pipe for the rough going on construction jobs.

Another Naylor feature on the water project illustrated here is the use of Naylor Wedge-Lock Couplings which contractors have found to be the fastest and easiest method of connecting pipe.

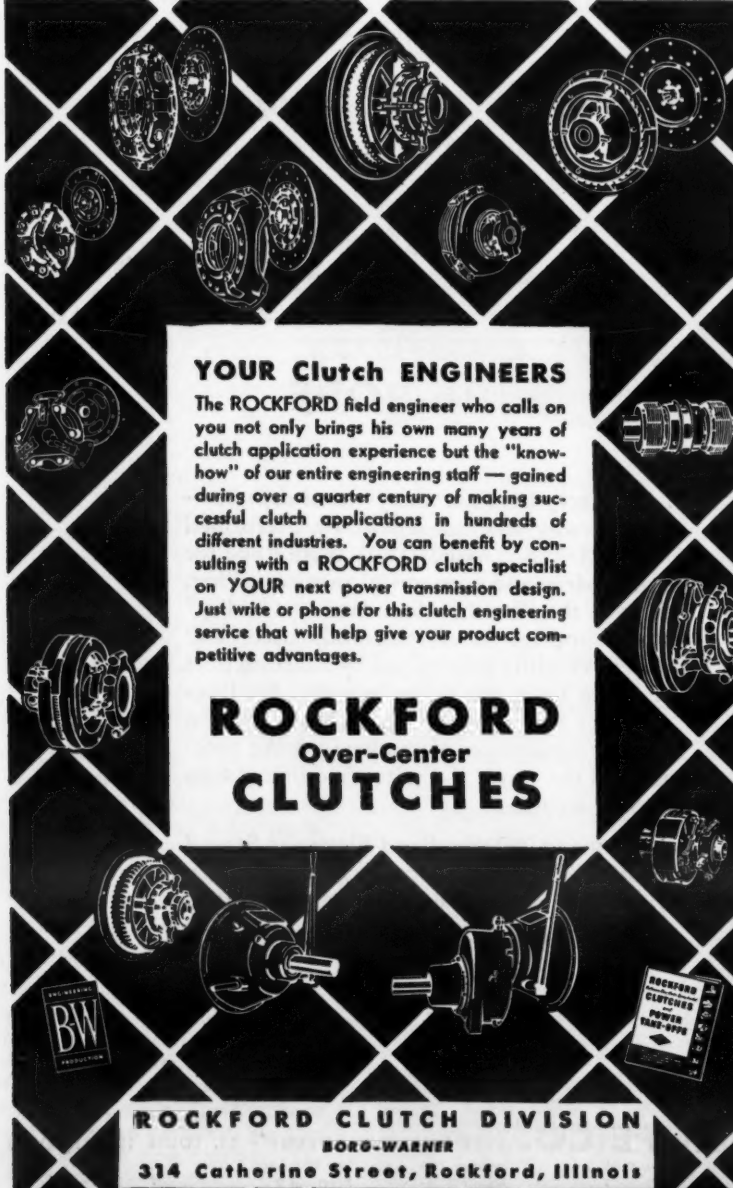
Look into this combination of pipe and couplings for your jobs whether they require water lines, "high" air lines, ventilating lines, cement pumping pipe, dredging, hydraulic sluicing, sand and gravel conveying, and other service calling for pipe from 4" to 30" in diameter.

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Maine Harbor Gets A 5-Foot Dredging

**Veteran Clamshell Rig Digs
2,100,000 Cubic Yards to
Deepen Portland Harbor From
30 to 35 Feet**

THE harbor at Portland, Maine, one of the finest on the Atlantic coast, has been improved in a 2,100,000-cubic-yard dredging project which increased its depth from 30 to 35 feet at mean low water. Under the supervision of the New England Division, Corps of Engineers, U. S. Army, the work was done by the Morris & Cumings Dredging Co., Inc., of New York City at a cost of \$1,037,000, or a unit price of slightly less than 50 cents a yard. All the work was handled by the contractor's No. 7 dredge, a clamshell rig built in 1905, employing either a 12 or an 18-yard bucket. Dredging started in March, 1949, and was completed in June, 1950.

The improvement begins at the east end of Portland Harbor, across from the Maine State Pier, and extends back up the Fore River 2.2 miles to the head of navigation at the fixed bridge of the Boston & Maine Railroad spanning the river. Two vehicular bridges, connecting South Portland and Portland, also cross the harbor channel. The width of the project varied. A maximum width of 1,170 feet was dredged at the east end to provide a turning basin opposite the row of commercial piers along the busy Portland waterfront. Seaward of this point, shipping passes through the deep waters of Casco Bay outward bound to the sea.

From the outer end of the improvement the deepened channel narrows to a width of 680 feet in a linear distance of 1,600 feet. The 680-foot width is maintained for 2,400 feet, or to a point 750 feet from the Portland Bridge, whence it tapers gradually down to 100 feet at the draw span. For the 6,400 feet from Portland Bridge to Vaughan Bridge, which carries U. S. 1, the channel is 400 feet wide. Between Vaughan Bridge and the B. & M. Railroad span, a distance of only 700 feet, a 300-foot width is maintained to the end of navigation in the harbor.

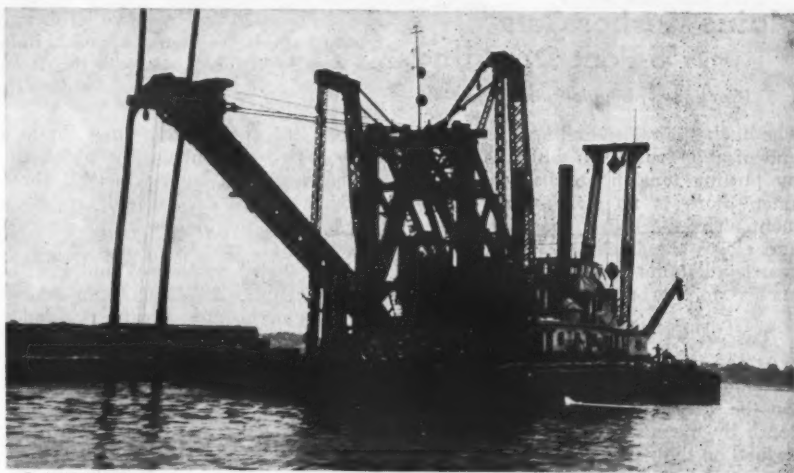
No. 7 Dredge

The No. 7 dredge was built by its present owner, Morris & Cumings Dredging Co., Inc., 45 years ago in Brooklyn. It has a wooden hull of pine timbers 140 feet long x 50 feet wide and 16 feet deep. The bottom planks are 5 inches, while the sides are 8 inches plus a 3-inch sheathing to give an 11-inch overall thickness. Its two steam engines, located port and starboard forward, were built by the Portland Co. right there in Portland, Maine, where the dredge was working. All the auxiliary steam engines were supplied by

the same company and are the original installations.

In 1931 the initial boilers were replaced with two units from the Coatsville Boiler Works at Middleton, Pa., and conversion was made from coal to oil fire. Each of these locomotive-type boilers has two burners in its built-in fire box, and is rated at 1,000 hp each. The average pressure is around 105 to 110 pounds. The boilers are located in the hold, well aft of amidships. They consume an average of 3,600 gallons of bunker C No. 6 fuel oil in 24 hours of operation.

The dual Portland main steam engines have a 21-inch bore and a 24-inch stroke, and each engine drives a hoist gear placed slightly forward. The gear units are king-size, being 1 foot wide x

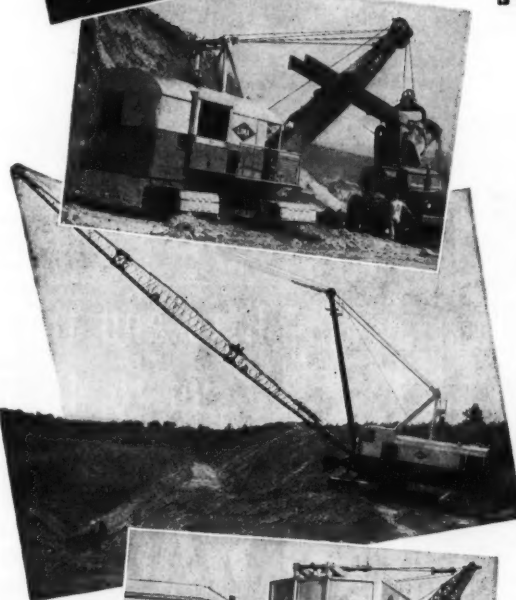


C. & E. M. Photo

Morris & Cumings' No. 7 clamshell dredge was built 45 years ago in Brooklyn and was converted from coal to oil fire in 1931. She dug 2,100,000 yards to improve the harbor at Portland, Maine.

11 feet in diameter, with a 6-foot-diameter hoist drum. Both drums are used to hoist the heavy digging bucket on

two of the 2 1/4-inch Leschen cables which are used throughout the dredge. (Continued on next page)



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Hayward Buckets

Maine Harbor Gets A 5-Foot Dredging

(Continued from preceding page)

The bucket is raised and lowered at the end of a 70-foot boom which is swung by putting tension on the two wires, since there is no swing-gear equipment. The starboard gear also opens and closes the bucket, while the port gear is a holding line with a direct connection to the bucket.

Digging Operations

At the tip of the boom are two 98-foot-long poles, which serve as a guide for the bucket and also indicate the depth by means of 2-foot markers inscribed on their perimeter. For protection on the harbor bottom, the timber poles stick into 23-foot lengths of 16-inch pipe which prevent the wood from cracking. The boom is tied back to a combination A and gallows frame 65 feet high. Behind this framework are port and starboard spuds weighing 47 tons each, made of hollow steel cylinders 70 feet long x 5 feet in diameter. A separate engine just forward of the boilers raises and lowers these two forward spuds.

At the center of the stern there is a third spud, 69 feet long x 4 feet square, built of steel plate and weighing 50 tons. It is placed within the deck and is operated by a separate steam engine and a spud gear which also activates four haul lines and a stern anchor line. On this job the dredge worked entirely by the spuds in moving forward. The stern spud, aft of amidships, is pitched slightly forward. In advancing, the two forward spuds are picked up, while the weight of the rear spud, bearing on the bottom at a slight angle, forces the craft

ahead about 10 feet a move. The two forward spuds are then dropped to hold the dredge in position, while the stern spud is raised and then lowered into its normal place.

From the stern a line runs out to a buoy and 3-ton anchor by which the dredge is pulled back when all three spuds are lifted. The usual procedure was to work the dredge along a cut 55 feet wide for a maximum distance of 800 feet, then haul it back and start in a parallel cut. The No. 7 can take a 70-foot cut, but for greater efficiency the width was kept to 55 feet. At the stern are anchor arms port and starboard that can be connected to anchors or deadmen off to the sides, but they were not needed or used in the quiet waters of Portland Harbor. Stern haul lines were employed to moor and position the dump scows that tied up alongside the dredge.

Two Buckets

The material on the bottom varied considerably from easy digging in soft mud, to sand, clay, stiff clay, and hardpan. Two different sizes of clamshell buckets were used—an 18-yard bucket for the soft stuff and a 12-yard one for the hard digging. The latter, though smaller, weighed more and had greater leverage and closing power. A 2-foot overdepth was allowed, so where the contractor dug to 37 feet instead of the required 35 he was paid for the yardage that was excavated.

Dredging started at the sea end and proceeded up the harbor and into Fore River. Material was loaded into three bottom-dump scows holding 1,400 cubic yards each. Usually only two were required, with the third held as a spare, for while one scow was being loaded,

(Concluded on next page)



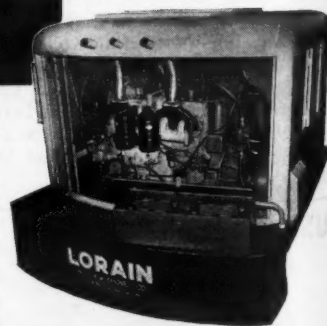
The schedule of Megarry Brothers (St. Cloud, Minn.) highway rebuilding job between Nisswa and Pequot Lakes, Minn., calls for moving 3,000 yards of earth every 10 hours. A LeTourneau 23-yard scraper works in the big cut at night by light cast from two of the four Onan 5-kw lighting plants on the job.



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with its two
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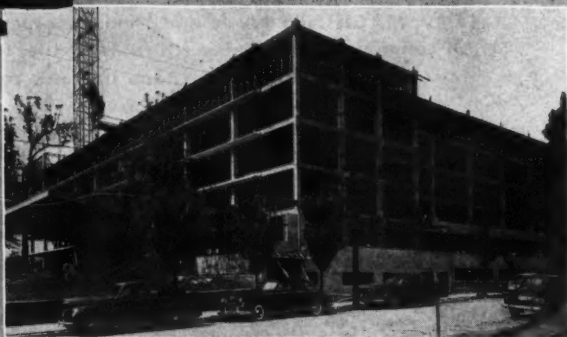
● New fields in heavy material handling by mobile equipment, are being opened by this giant, rubber-tired two-engined crane. Said to be the world's largest, the first of these Waukesha-Diesel-powered Lorain MC-820 Moto-Cranes is working in the world's largest steel mill. It has a safe-rated lifting capacity of 45 tons (90,000 lb.) at a 12-ft. radius. Thirty years ago when Thew built the first portable crane—also a Waukesha-powered Lorain—its capacity was only 3 1/2 tons. The latest Lorain's ability to lift and transport far heavier loads than any previous portable crane, extends the basic advantages of the moto-crane for handling heavy material in steel mills, steel erection, ship and bridge building, oil fields, logging and many other industries.

A crane is no better than its engines. With their 30 years of motorized crane experience, Thew Shovel Company engineers chose two big Waukesha Super-Duty Diesels to power the world's largest moto-crane. Waukesha Diesels are winning recognition everywhere as the world's finest power plants of their size and type. Get Bulletin 1415.

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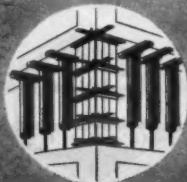
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the other was being towed to sea and dumped. A round trip for unloading took about two hours. A hired tug, *Dawntless*, a 70-foot boat with a 1,600-hp diesel engine, towed the scows to disposal areas far out in Casco Bay. Deep waters to receive the waste were spotted at the east end of both Long Island and Peak Island, a 7-mile haul from the harbor.

The sides of the harbor were not too far apart, so land ranges were used to keep the dredge in position. Work was sustained on a basis of a 24-hour day, 6 days a week, with an average of 40,000 yards being dredged per week. A maximum of 70,000 yards a week was reached in soft digging. For night work one of the steam engines powered a General Electric 25-kw 200-amp generator which furnished current for the powerful floodlights. Regular day lighting on the dredge was supplied by a 7½-kw generator.

Auxiliary Craft

Operations of the dredge were controlled from the pilot house located high above the deck between the columns of the gallows frame. The operator moved two levers on the right to actuate the starboard engine, and two on the left for the port engine. Directions and orders to the crew were spoken into a microphone, and were amplified through several loud-speakers spotted around the deck and also in the engine room. There was also the usual telephone communication between pilot house and engine room.

The No. 7 carried in her tanks 22,000 gallons of fuel oil, and was refueled once a week by the contractor's own oil barge, a self-propelled craft that held 22,000 gallons. The Mexican Petroleum Co. furnished the bunker C oil to a dock in Portland where it was transferred to the supply barge. Water came from the Portland city system, and was towed to the dredge in a 20,000-gallon wooden barge by the hired launch *Mohawk*, a 35-foot 160-hp diesel craft.

Personnel

A 40-man crew served the dredge, some of whom slept aboard and others ashore; the No. 7 can accommodate 34. Its master is Captain Samuel Conrad Nystrom, who has been with the dredge ever since it was built; Chief Engineer is Walter Cole. Morris & Cumings Dredging Co., Inc., was also represented by Max Ott, Superintendent, and Edward Misk, Engineer.

For the Corps of Engineers, the project was inspected by H. W. Kenyon, Area Engineer. The New England Division is headed by Col. Henry J. Woodbury, Division Engineer, while H. Whitcomb is Chief of the River and Harbor Operations Division.

Material-Flow Equipment

A series of material-handling case studies has been made by field men of The Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids 2, Mich. Four-page-folder field reports are now available which outline case problems and solutions in using conveyors for handling lumber, building materials, millwork, and other bulk and packaged products. Results of new methods are given in statistical form, and in many cases a floor-plan drawing is included. All reports show installation photographs with descriptive captions.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 85.

Permalite in Texas

The Perlite Products Corp., incorporated in August with a capitalization of \$110,000, will begin production of Permalite, a lightweight plaster aggregate, in Dallas, Texas, about the middle of November. The company is erecting

a prefabricated steel building on Harry's Road to house office, furnace, and storage space.

Perlite Products Corp., has a franchise from the Great Lakes Carbon Corp. to produce Permalite for north and west Texas.

Single-Contract Advantages

"Undivided Responsibility—Key to Lower Construction Costs" is the name of a booklet just released by the Associated General Contractors of America, Inc. Intended for individuals or groups contemplating the erection of new buildings or the extensive remodeling of old ones, the booklet argues for the single-contract system and gives reasons why the general contractor is in a position to render superior service under this system.

The booklet may be obtained from any of AGC's 112 chapters and branches or from the association's headquarters in the Munsey Bldg., Washington 4, D. C. There is no charge.

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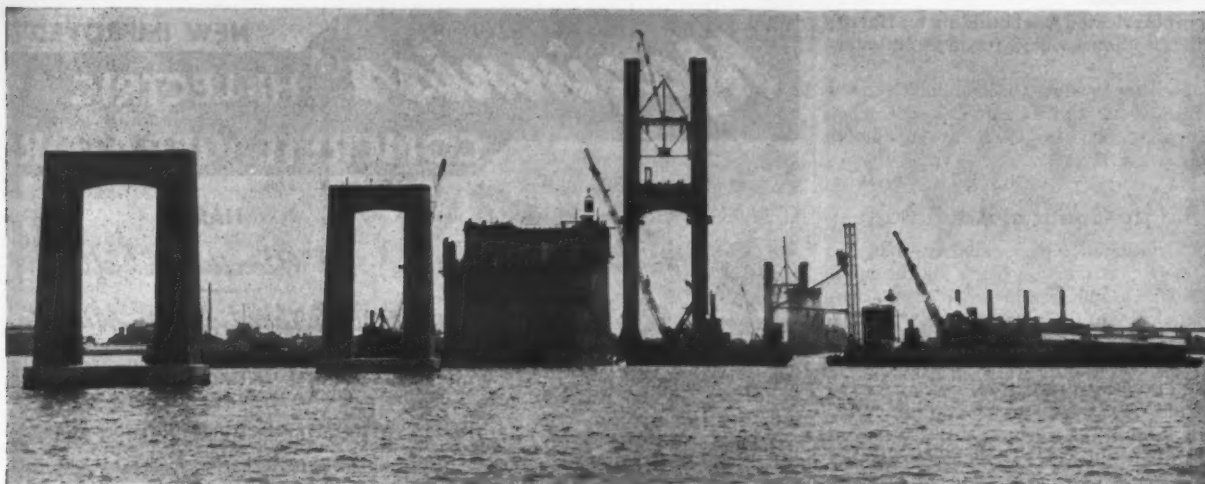
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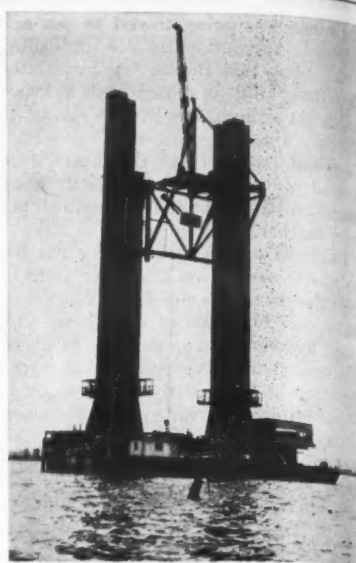
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C. & E. M. Photos
The Delaware Memorial Bridge under construction, as seen looking toward the New Jersey side from the Delaware side. The Merritt-Chapman & Scott Corp. concrete plant is at one side of pier A, the west anchorage, where final lifts are being poured. American Bridge Co. steel erection proceeds on the west tower, pier B, and on the east tower, pier C, shown in closeup at right.



Crossing the Delaware—1950

Steel Erection on Delaware Memorial Bridge

Travelers Work From Both Sides of River; Creepers Raise Tall Twin Towers for 2,150-Foot Suspension Span

★ STEEL erection on the mighty Delaware Memorial Bridge is moving ahead to meet the opening date scheduled for July, 1951. This new crossing of the Delaware River, 2 miles south of Wilmington, Del., measures 10,765 feet between abutments—including a 2,150-foot suspension span, the sixth longest in the world. The latter provides for navigation a 175-foot vertical clearance over a 1,500-foot channel. Total project length with approaches is $3\frac{1}{2}$ miles from the connection to New Castle Road in Delaware, to Deepwater in New Jersey, where the New Jersey Turnpike, now under construction, will have its southern terminus.

The Delaware State Highway Department is building the four-lane toll structure with funds derived from a \$40,000,000 bond issue. The American Bridge Co. of New York City holds all three steel superstructure contracts totaling \$13,731,090. This figure includes \$6,119,300 under Contract 4, totaling 17,400 tons of steel for the two towers and suspended steelwork; 3,760 tons of material for cables and suspenders under \$2,311,985 Contract 5; and Contract 6 for \$5,299,805 involving 15,230 tons of approach superstructure steelwork.

The American Bridge Co. began erecting steel from both ends of the long structure late in February, 1950, when the approach land piers were completed. The substructure was not entirely completed until August when Merritt-Chapman & Scott Corp. of New York City placed its last bucket of concrete in contracts totaling around \$15,000,000 for tower piers, anchorage foundations, anchorage blocks, and six river piers. The latter include W4, W3, W2, and W1, west of the suspended span, and E1 and E2, east of the suspended span. Under other substructure contracts twenty land approach piers were built on the Delaware side, and fifteen on the New Jersey side, together with an abutment at either end.

Truss, Girder, and Suspension

From the west abutment east across the river, the superstructure consists of 12 girder spans at 93 feet 4 inches, followed by 8 girder spans at 116 feet 8 inches out to transition pier W5, the last land pier on the Delaware side. Then over water are five 336-foot 6-inch truss spans to the 129-foot 3-inch west anchorage pier A. Proceeding

Jersey-ward is a 750-foot side span to west tower pier B, the 2,150-foot center span to east tower pier C, and another 750-foot side span to east anchorage pier D, also 129 feet 3 inches long. Then come five truss spans at 336 feet 6 inches, three over water and two over land, to transition pier E5. From

there to the east abutment there are 13 girder spans—7 at 116 feet 8 inches, followed by 6 at 93 feet 4 inches.

This combination of girder, truss, and suspension spans will carry two 24-foot concrete roadways, separated by a 3-foot raised median, and flanked on each side by a 3-foot sidewalk. The

floor system is designed for H20-16-44 loading. Live load on the stiffening trusses and towers was figured at 2,250 pounds per linear foot of bridge, and the wind load on trusses at 30 pounds per square foot, and on towers and cables at 35 pounds per square foot. Design data on the cables are set at 5,750 pounds and 1,125 pounds per foot of cable for dead and live loads respectively, and for wind loads at 35 pounds per square foot. The normal temperature is considered to be 68 degree F.

Steel for the structure came from various plants of the American Bridge Co. The west tower (pier B) was fabricated at Ambridge, Pa., and the east tower (pier C) at Gary, Ind. Plate-girder and truss spans, together with the steel in the suspended portion of the bridge, were supplied by the Ambridge, Pa., and the Trenton, N. J., plants. All cable wire and suspenders were furnished by the American Steel & Wire Co., from its plant at Trenton, N. J.

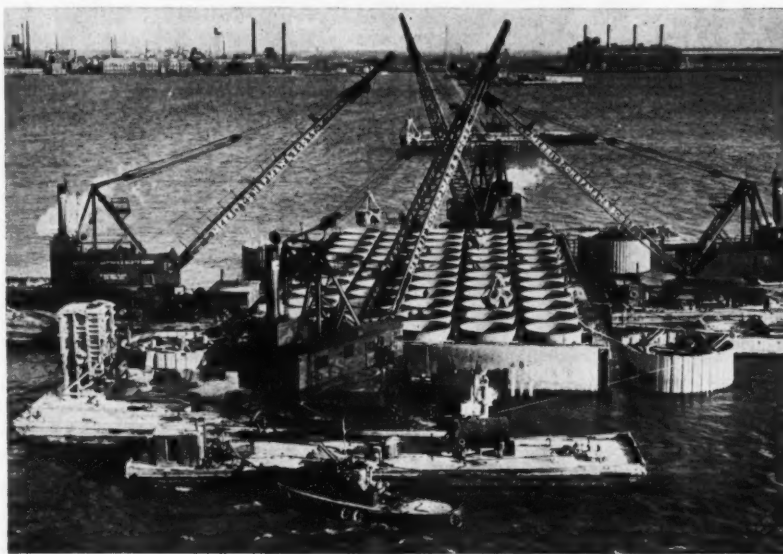
By Rail and Barge

Steel for the plate-girder spans and truss members for the spans over land were delivered to the bridge site by rail over special sidings running down to the water and parallel to the bridge. On the Delaware side, the supply track connected to the New Castle branch line of the Pennsylvania Railroad. On the New Jersey side the spur joins the Pennsylvania-Reading Seashore lines. Material for the river work—towers, trusses, cable wires, and suspension steel—was delivered by rail to the Wilmington Marine Terminal on the Delaware River 3 miles above the bridge site. There it was loaded on barges and towed downstream where it was moored in position for handling and pickup.

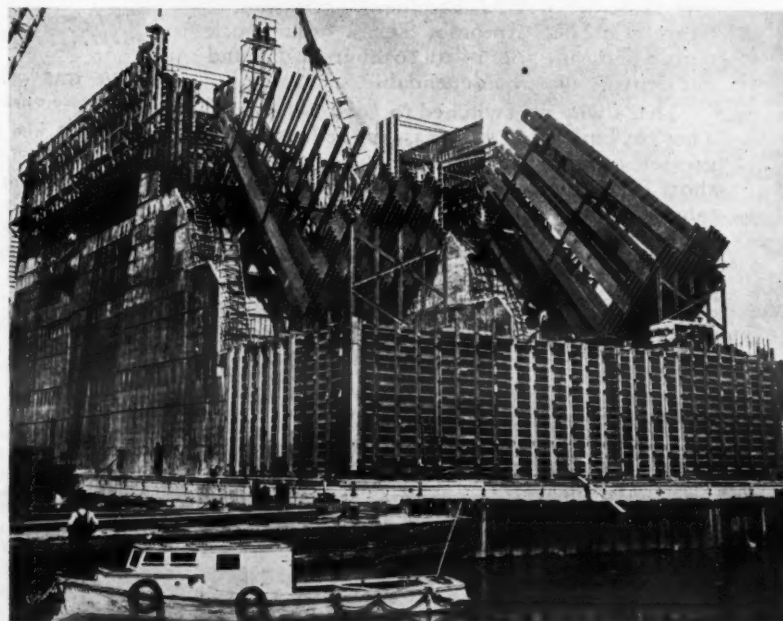
The girder spans, all over land, were erected by crawler cranes, two to each side of the river. The rigs were Manitowoc Speedcranes—a 3900 model at 60 tons and a 3000 model at 30 tons for each half of the job. All four units were equipped with 100-foot booms and 30-foot jibs. They unloaded and set the steel, which was first bolted and pinned then riveted together. The longest plate girders handled by the crawler cranes were 116 feet 8 inches long, weighing 39 tons.

Four riveting crews worked on each side of the river, driving the rivets from platforms hung on the steel members. Equipment included Chicago Pneumatic and Ingersoll-Rand pneumatic wrenches, hammers, and air

(Continued on next page)



Merritt-Chapman & Scott Corp. Photo
Here is an early photo of the 60-well caisson used by Merritt-Chapman & Scott Corp. to construct the west anchorage, pier A. Circular "sand islands" 30 feet in diameter were built at each corner to hold the caisson, 95 feet wide x 221 feet long, in position during the early stage of the sinking operation.



Merritt-Chapman & Scott Corp. Photo
And here is the east anchorage, pier D, when it was up some 100 of its ultimate 158 feet above the Delaware. Nineteen cable strands will loop through the eyes of the anchor beams and converge to form the bridge's 20-inch-diameter suspension cable.

compressors. The two girders in the spans are 8 feet 4½ inches deep, measured back to back of angles, and are on 39-foot centers. Cantilever members extend out 10 feet on each side. For the girder spans ¾-inch rivets are used, as well as in the suspended spans. In the trusses and towers, 1-inch rivets are used to a considerable extent, along with some ¾ inch in size. The vertical rivet pitch in the tower shafts and struts is 4 inches.

Travelers Erect Trusses

As the final plate-girder land spans were erected, the crawler cranes helped to set up travelers, one on each side of the river, which move themselves forward over the floor system of the superstructure. The rigs are American Bridge stiffleg derrick travelers, 60-ton capacity, equipped with 105-foot booms and 3-drum hoists. Working along the top chord they erect the trusses over the water, placing them on 39-foot centers. The trusses are 40 feet deep, measured center to center of chords.

For the first span on each side, three temporary steel falsework bents were constructed at the second, fourth, and eighth panel points of the twelve-panel 336-foot 6-inch spans. After the first span is erected, supported on the falsework bents, the remaining four truss spans on each side will be erected in order by cantilevering across the water to the anchorage piers. A single falsework bent will be constructed at the eighth panel point of each of these other spans.

These bents are built with steel H-beam piles driven into the river bottom from a floating pile driver equipped with a McKiernan-Terry 10-B-2 double-acting hammer. The piles support a steel grillage on which the tower-type bents are erected. Truss members are picked up from the steel barges in the river, and set in position by the travelers, the lifting done chiefly with a four-part line. The boom on the traveler is tied back to the derrick legs with a 17-part line.

Tall Towers

The twin towers, with top elevation at 437, are 417 feet above the masonry piers on which they are built. Each of the two shafts in the towers is 15 feet wide x 20 feet at the bottom and 13 feet 6 inches at the top, measured back to back of angles. Between the shafts there is a 58-foot horizontal clearance at the bottom, decreasing to 54 feet at the top. Most of the steel angle members are 8 x 8 x ¾-inch sections; the heaviest single piece in the tower construction weighs 54 tons. The tower design provided for 13 vertical tiers varying in length from 23 to 40 feet, the former at the base and the latter at the roadway level.

At the top the shafts are connected by an arched portal strut with a minimum depth of 25 feet. A similar lateral connection is at the fifth tier from the bottom, just below the roadway. At the towers, the crown of the pavement is 170 feet 5 inches above the top of the masonry piers.

Work on the towers got under way in March and was expected to be completed in August. After the first two tiers were set by derrick boats to a height of 77 feet above the water, a creeper traveler was set up on each tower to erect the rest of the steel. The creepers are also 60-ton stifflegs, made of silicon steel, equipped with 90-foot booms and 3-drum hoists. They were assembled by the derrick boat.

After a creeper erected steel for two tiers, it was jumped to a higher level with two sets of wire-rope falls, one at each tower shaft. The maximum single jump was almost 70 feet. Ten riveting gangs were used in the tower erection, working on specially designed American Bridge steel scaffolding.

(Continued on next page)



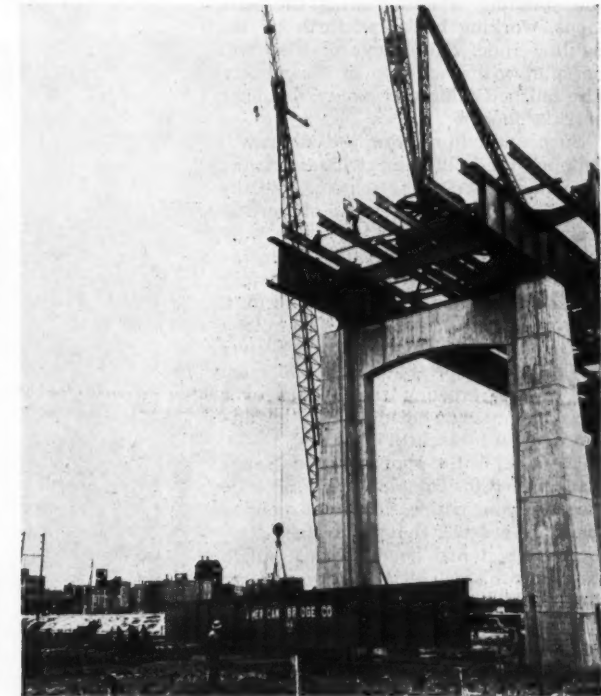
C. & E. M. Photo
An American Bridge Co. 50-ton traveler works over pier W5, the last land pier on the Delaware side of the river.



C. & E. M. Photo
Still on the Delaware side, we see riveters working from suspended platforms. Crawler cranes erected all land girder spans.



C. & E. M. Photo
On the New Jersey side, a Manitowoc 3900 Speedcrane lifts from a flatcar a 31-ton 30-foot-long girder for pier E6.



C. & E. M. Photo
As the crane walks ahead, workers with hand lines swing the girder in front of the pier so the traveler can pick it up.



Merritt-Chapman & Scott Corp. Photo
The bridge will be the sixth longest suspension bridge in the world. This sketch is by A. G. Lorimer, consulting architect.

Steel Span Erection For Delaware Bridge

(Continued from preceding page)

folds which encircle the periphery of each shaft leg and are raised or lowered by winches. The heater and driver are on the scaffold outside the shaft, while the bucker-up works on the inside. Instead of being tossed, the rivets are passed pneumatically through a flexible metal tube which has a bore slightly larger than a rivet head.

Cable Spinning

When the towers are completed, a 20-ton guy derrick with 60-foot boom will be set up on top of each one for the purpose of removing the creeper, and to assist in the erection of the cable-spinning machinery. The bulk of this equipment, including the diesel-driven spinning engines, will be set up on the anchorages. The two cables will hang in parallel arcs 61 feet apart on centers. A cable contains 19 strands, with each strand made up of 436 wires. A single wire, after galvanizing, measures 0.196 inch.

Spinning was expected to get under way during September with the use of conventional-type spinning equipment, the spinning wheels pulling the wire loops, working back and forth by the hauling rope. Four loops of wire will be spun with each trip of the wheels. The finished cable will have a diameter of 20 3/4 inches.

Suspenders hung from the cables will support the stiffening trusses of the suspended spans. The trusses, like the cables, are 61 feet in centers, and are 20 feet deep. They will be erected by four 60-ton travelers working from the towers. Two of the traveling derricks will advance from the tower piers until they meet at the center of the long 2,150-foot span. The other two travelers work in the opposite directions from the towers, erecting the trusses over the 750-foot side spans until the anchorages are reached.

The steel in the approach truss spans is scheduled for completion by the time the stiffening trusses in the suspended spans are erected. Before the steel came to the job it had been given a single shop coat of red lead. After erection, three field coats will be applied—another of red lead, then one of blue-tinted aluminum, and one of straight aluminum.

Two More Contracts

After the steel superstructure is completed in the early part of 1951, the bridge will be paved with a 7-inch concrete slab, reinforced top and bottom with a steel mat. The decking will be done by the Whiting Turner Construction Co. of Baltimore under a \$1,043,000 contract, which will contain such major items as 11,500 cubic yards of concrete and 2,600,000 pounds of reinforcing steel. Maximum grade on the pavement is 4 per cent.

After the 19 strands in each cable are connected to the huge steel eye bars that are partially embedded in the two anchorage piers, the remainder of the concrete will be placed in these structures. This work will be done under a \$1,132,000 contract that has been awarded to Lewis & Bowman, Inc., a



C. & E. M. Photo

You're looking back over the approach steel erected on the Delaware shore.

Goldsboro, N. C., firm of contractors.

Toll booths and administration building are to be constructed on the Delaware side. Practically all of the river crossing is in Delaware since the state line follows the low-water mark on the

New Jersey shore. This new Delaware Memorial Bridge is the only structure spanning the Delaware River below Philadelphia. It will be a boon to motorists who have been plagued by heavy traffic congestion on the two ferry lines

crossing the river in that vicinity—the New Castle-Pennsville ferry from Delaware to New Jersey, just south of the bridge site; and the Chester, Pa.-Bridgeport, N. J., ferry located to the north.

Personnel

The American Bridge Co. employed an average force of 250 in the erection of the steel superstructure. Supervisory personnel included J. M. Nash, with headquarters in Pittsburgh, who is Manager of Erection in the Eastern Region; Edward Nimmergood, Superintendent of the Delaware approach and the suspension-bridge portion of the work; A. E. "Buck" Wotring, Superintendent of the New Jersey approach; and John T. Martin, the Resident Engineer.

The consulting engineering firm of Howard, Needles, Tammen & Bergendoff, of Kansas City and New York, designed the structure and is supervising the construction for the Delaware.

(Concluded on next page)

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ware State Highway Department. Homer R. Seely is Project Engineer.

The Delaware State Highway Department has set up a Delaware Crossing Division to direct work on the bridge and approaches. It is headed by W. W. Mack, a consulting engineer for the Department and a former Chief Engineer, as Director. William A. McWilliams, also a former Chief Engineer of the Highway Department, is Associate Director.

The Delaware Memorial Bridge, with its main suspension span of 2,150 feet, is exceeded in length by the two bridges at San Francisco—the 4,200-foot Golden Gate and the 2,310-foot Transbay from San Francisco to Oakland; by two at New York—the 3,500-foot George Washington bridge across the Hudson River, and the 2,300-foot Bronx-Whitestone bridge over the East River; and by the 2,800-foot Narrows bridge at Tacoma, Wash. The latter collapsed shortly after its construction in 1940, but is now being replaced at the same site.

House Construction Costs

G. Underwood, who has been building subway stations, aqueducts, and commercial and private dwellings for the past 39 years, has written a book on house construction, with emphasis on cost estimating.

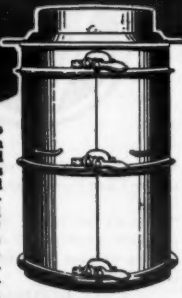
The book describes in some detail house-building operations and methods: earthwork, concrete, masonry, carpentry, roofing and flashing, lathing and plastering, plumbing, heating, lighting, painting, and papering. For each class of work it computes unit costs which can be used as models for deriving new unit costs in a particular locale according to material and labor rates which prevail there. The final chapter outlines a summary sheet for an estimate. Sketches throughout the book show types of wall construction, details and spacing of framing lumber around window and door openings, etc.

"House Construction Costs" is priced at \$4.50 and may be obtained from McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., or at your local bookstore.

Leschen Names Dickson

Russell J. Dickson has been appointed District Manager for the Chicago territory by A. Leschen & Sons Rope Co. of St. Louis. He succeeds Mark Arnold, who retired July 1 after 47 years of continuous service with Leschen. The territory served by the Chicago district is Minnesota, Wisconsin, Michigan, northern parts of Illinois and Indiana, and eastern Iowa.

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C. & E. M. Photo
Here are Safety Engineer Clarence Ayers and Resident Engineer John T. Martin of the American Bridge Co., with Homer Seely, Project Engineer for the consultants on the Delaware Memorial Bridge.

Self-Propelled Tamer

For Asphalt and Soil Work

Nineteen hundred blows per minute, each over 1,250 foot-pounds in impact, can be struck by the 240-pound self-propelled Wayer Impactor, according to a new 4-page folder issued by Wayer Impactor, Inc., 12 N. Third St., Columbus 15, Ohio. The folder illustrates the impactor working on hot and cold bituminous materials, dry concrete, mastic and cement composition, floor base, and various soils.

This unit, it points out, works in small or restricted areas to give the compaction equivalent of a 10-ton roller. It can get right up to curbs, in ditches, and up against building walls. Its light weight makes it easy to transport on almost any mobile unit, the company points out. Complete specifications, features, and applications are listed in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 70.

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What better proof could you ask of the economy you get with the new Oliver "88" Diesel Wheel Tractor? On this job an "88" Diesel is handling two rubber-tired compaction rollers vs. a gasoline powered tractor of equivalent size pulling one roller. The owner reports a fuel cost saving of 50% even though the Diesel model was pulling a load of 39,000 lbs. vs. the Gasoline model pulling a load of 25,000 lbs.

The new Oliver "88" is a natural for industrial wheel tractor operations. It's remarkably

easy to start . . . requires no starting preparations. Overall efficiency is high due to superior air and fuel mixture. Efficient burning of fuel and air assures exceptional fuel savings. Prolonged piston head pressure increases lugging ability under heavy loads.

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A complete line of Industrial Wheel and Crawler Tractors





The Orton Powermatic excavator is convertible to shovel, crane, dragline, and ditching operations. It comes in eight models with a capacity ranging from $\frac{1}{2}$ to $2\frac{1}{2}$ cubic yards.

Convertible Shovel

The new excavators manufactured by the Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill., are fully convertible for shovel, crane, dragline, and ditching operations. The Orton Powermatic is made in eight models with a capacity ranging from $\frac{1}{2}$ to $2\frac{1}{2}$ cubic yards.

Air-operated controls on these units are designed to reduce operator fatigue. The units are of alloy steel electrically welded throughout, and have anti-friction bearings. The complete tread bolster and tread base in this series are made from heavy one-piece weldments. The turntable is carried on an alloy-steel roller with anti-friction bearings. Only four power shafts are required for the operating mechanism; this design gives the least possible number of gear reductions and results in minimum loss of power transmitted from the engine to the operating mechanism, says Orton. Each power shaft carries a clutch for controlling its particular function, thus providing a separate clutch for propelling, hoisting, crowding, boom swinging and radius-varying, so that all of these operations can be performed independently or simultaneously. Gasoline or diesel-engine power source is optional. The cab is all-steel, and a complete set of tools, is supplied with the machine as standard equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 110.

A High-Speed Truck

The new Reo Speed Wagon truck Model E-19 has been announced by Reo Motors, Inc., Lansing 20, Mich. It has a gross vehicle weight of 14,500 pounds carried on 6.50 x 20 dual tires. Larger tire sizes are also available. The new truck is powered by Reo's Gold Crown truck engine. The heavy-duty power plant has a displacement of 245 cubic inches, chrome molybdenum cylinder block, and a seven-bearing crankshaft. Clutch size is 11 inches. The Speed Wagon is available in four wheelbases: 125, 150, 170, and 187 $\frac{1}{4}$ inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 55.

Pioneer Personnel Changes

Changes in the executive setup of Pioneer Engineering Works, Inc., as a result of the acquisition of the company's stock by Poor & Co. of Chicago have been announced by the Board of Directors.

Lewis W. Yerk was re-elected President and General Manager. Melvin Ovestrud was re-elected Vice President and Works Manager. Former Secretary-Treasurer K. E. Brunsdale was elected Vice President in Charge of Sales. O. J. Ellertson, formerly Assistant Secretary and Assistant Treasurer, is now Treasurer. C. R. Rolf, formerly Assistant Sales Manager, is now Assistant Secretary and Sales Manager.

Bridge and Its Story Reach Second Editions Together

D. B. Steinman, one of the foremost bridge engineers of our day, took five years out of his professional life to write a biography of the Roeblings, father and son, whose careers had their climax in the building of the Brooklyn Bridge. He told in his book how John Roebling, after his revolutionary invention of wire rope, fought for years to prove that suspension bridges could be built to carry the heaviest loads over the longest conceivable spans; how he built a span to carry trains over Niagara and completed his great Ohio River bridge at Cincinnati; then how he drew up plans for the greatest challenge of them all, a suspension bridge between Brooklyn and Manhattan—only to be killed in a construction accident; how his son Washington Roebling carried the task forward until he fell victim to the dreaded caisson disease; but how, bed-ridden, he continued with his wife's help to direct the work from his Brooklyn home overlooking the bridge.

The span was opened in 1883. Now, almost 80 years later, it is to be reconstructed to meet modern traffic needs. Dr. Steinman has been commissioned to make the engineering studies and draw plans for rebuilding the structure—the suspended roadways, the stiffening trusses, and the approaches—to increase its capacity from two lanes to six.

As a new edition of the bridge gets under way, it is fitting that Dr. Steinman's publisher should have brought out a new edition of his Roebling biography, "The Builders of the Bridge". Except for corrections and an enlarged format, the book remains essentially unaltered. So too with the bridge, for Dr. Steinman writes in his 1950 epilogue to the new edition that the appearance of the great old bridge will not be changed. "To me," he says, "Brooklyn Bridge is sacred."

Harcourt, Brace & Co., Inc., 383 Madison Ave., New York 17, N. Y., is the publisher of "The Builders of the Bridge". The price is \$5.00.

Allis-Chalmers Branch Office

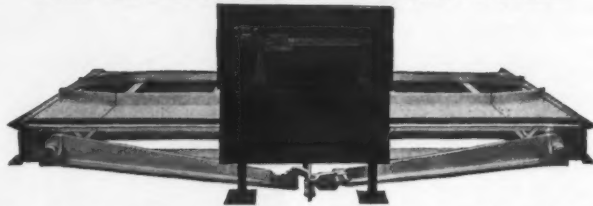
Work on a \$350,000 Allis-Chalmers tractor branch office in Atlanta, Ga., was started in July and the building is expected to be completed around January 1, 1951. Some 60,000 square

feet of office and warehouse space will house for distribution tractors and implements shipped from five Allis-

Chalmers tractor plants. General contractor for the building is Van Winkle & Co. of Atlanta.

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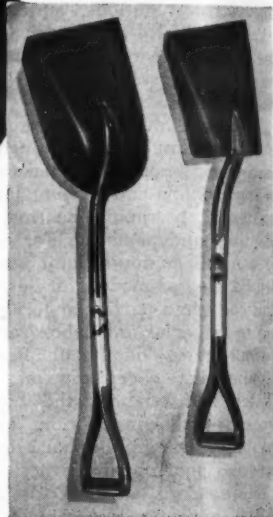
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Roadside Development Course in Louisiana

Two-Day Session Is Devoted to Various Aspects of Roadside Work And Its Relation to Highways; Was First of Its Kind in Louisiana

A SHORT course in roadside development was held at Louisiana State University in Baton Rouge, June 29-30. Sponsored by the College of Engineering and the Louisiana Department of Highways, the two-day session was attended by 69 highway engineers—both state and Federal—landscape architects, members of garden clubs, and others interested in roadside and landscaping work.

The program, arranged by Torbert Slack, Louisiana's Roadside Development Engineer, combined papers on phases of roadside work by authorities on the subjects, and panel discussions of highway, roadside, and erosion-control problems.

H. A. Flanakin, Associate Professor of Highway Engineering at the University, defined the purpose of the meeting in his address of welcome. Roadside development, he said, is now recognized as a definite part of the highway program. He expressed the hope and intent of the sponsors that the short course, planned to provide information and discussion to further roadside development in all its phases, will become an annual affair.

Breadth of R. D. Program

The theme of the first session was the importance of a well thought out roadside-development program and its far-reaching effects in conservation, erosion control, and other indirect benefits, as well as lower maintenance costs and the protection and improvement of highways.

Torbert Slack presided at the session. In welcoming the group, Mr. Slack said: "We are not trying to sell you roadside development. You have already been sold or you would not be here. We do believe you have come to learn more about it, the things which should be done and, maybe, the things which should not be done. This is your meeting and we want you to take a part in it when the discussions are opened. The presence of the large number of engineers at this meeting signifies that roadside development has taken hold as an engineering feature of highway design, construction, and maintenance which, when combined with landscape procedures, makes for the complete and modern highway."

Speakers included Harold J. Neale, Landscape Engineer, Virginia Department of Highways, and Chairman of the Roadside Development Committee of the Highway Research Board; James Kitchens, Assistant State Forester, Louisiana Forestry Commission; and W. W. Wells, Assistant Director of the Louisiana State Parks Commission.

Mr. Neale, speaking on the subject "Highway Right-of-Way and Roadside Development", outlined the work of his committee and gave a resume of the progress made by the subcommittees in the many phases of roadside development such as turf shoulders, roadside parks and waysides, erosion control.

Roadside development as a contributing factor to conservation was Mr. Kitchens' theme. He spoke of the value of our forests and emphasized the hazards of fires which in many cases are due to carelessness. He stated that the Forestry Commission carries on an educational program for the prevention of fires, and suggested that each state agency do everything in its power to see that more educational work is done to acquaint its employees and also the public with ways and means to guard

against forest fires. Signs "Keep Louisiana Green" along the highways are proving effective, he said.

Mr. Wells described some of the state parks, and discussed the reasons for their location, their construction, and measures to preserve and conserve their historical and natural features.

R. S. Reich, Professor of Landscape Architecture at L. S. U., led the ensuing panel discussion.

Phases of Roadside Work

At the next session, presided over by Professor E. B. Doran, Head of the University's Department of Agricultural Engineering, roadside work in other states was described.

Wilbur J. Garmhausen, Chief Landscape Architect of the Ohio Department of Highways, reviewed the construction and maintenance of Ohio's many roadside parks. His talk was illustrated with color slides showing some of the parks and their facilities for the convenience and use of the traveling public. Touching on the public-relations value of

roadside parks, Mr. Garmhausen said: "Letters of praise which reach the State Highway Department prove that the public enjoys them."

"The purpose of the roadside park is to provide a clean, inviting, and well maintained park which will be available to the public at all times. The use of the roadside park may be considered as four-fold: It offers to the long-distance truck operator a place to stop,

drive off the road and park, get a drink of pure water, sleep or relax—as his needs may be—thereby reducing the danger of falling asleep at the wheel, and offering a corresponding reduction of hazards to other highway traffic. To the traveling motorist it offers relaxation or an attractive place to picnic. To families and small groups it offers a place for a change in their

(Concluded on next page)

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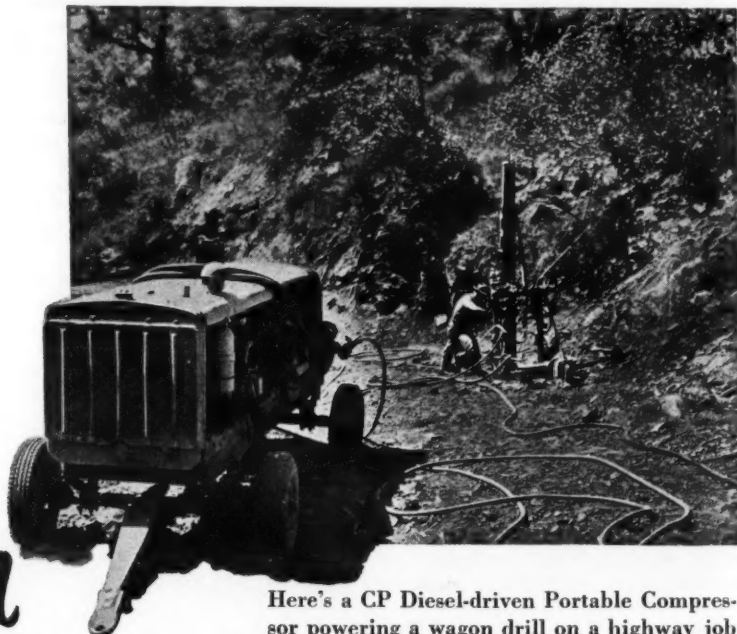


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Roadside Development Course in Louisiana

(Continued from preceding page)

regular routine of living. To larger groups such as church and school organizations, family reunions, clubs, etc., it offers a place for an outdoor meeting.

"If crowded roadside parks demonstrate a purpose, it is this: That these parks are no luxury, they are a necessity to this motor age. Their tangible benefits are manifold but their intangible values cannot be adequately appraised. Above all, they allow people a chance to escape for a few moments or hours from noise and confusion into a tiny world of leafy trees, sunshine, and peace."

The preparation of highway areas for sodding and seeding was discussed by A. E. Holmes, Landscape Engineer of the Mississippi State Highway Department. Mr. Holmes detailed the methods of disking, harrowing, grading for flatter slopes, conservation of topsoil, better drainage, fertilization of areas, transporting and placing various types of sod. Seeding operations were thoroughly explained. Of interest to many was his explanation of his experiment with a new kind of grass known as Centipede Grass.

Mr. Holmes stated: "The engineers are vitally interested in erosion control and most of our work with sod and seed is not 'beautification' but simply erosion control which leads to better-looking highways." Speaking of the handling and placing of solid sod Mr. Holmes added: "Once more soil preparation is necessary. I have seen sod put down on areas without ground preparation—on dirt as hard as any concrete floor. Then they wonder why it doesn't grow! True, the preparation of soil does not need to be so deep, but good preparation helps make a good bond between the earth and the sod. Whether sod comes in rolls and squares or some small dimension, a most important part of sodding is to be sure all cracks between the blocks or rolls are filled. A good way to do this is to top-dress all the cracks with loose dirt and be sure they are full."

In conclusion Mr. Holmes stated that he belonged to a men's garden club in Jackson, Mississippi, and the club's motto on how to grow a good lawn is: "Early to bed, early to rise, water like h— and fertilize!"

Following a panel discussion led by H. L. Lehman, Louisiana Department of Highways Testing Engineer, the group heard an interesting and instructive talk on the importance of public speaking in highway programs. Dr. W. W. Braden of the University's Speech Department outlined eight points to be considered in planning a talk. The first is "Know your subject" and the last is "Don't be a mouse".

Public Relations Again

At the dinner meeting held in the Banquet Room at Hatcher Hall, J. W. Wessman, Agricultural Engineer, International Harvester Co., gave a talk on the effect of roadside development in public relations.

A highway department's roadside-development program, Mr. Wessman said, is one of the best mediums of contact with the public. Much good can be accomplished for both the department and the public by such a program, for the condition of our roadsides is of interest to all.

Design, Construction, Maintenance

These subjects were covered in the final session. Wilbur H. Simonson, Chief, Roadside Section, Bureau of Public Roads, spoke on land access and land use as elements in highway landscape design. Marty Carter, District Engineer, Armo Culvert Co. of Houston, Texas, emphasized the importance of proper highway drainage, and C. C. Edwards, District Maintenance Engineer, Louisi-

ana Department of Highways, discussed good roadside maintenance.

In discussing highway design, Mr. Simonson said: "In the broadest sense, highway design rests upon landscape principles as well as upon the more commonly recognized engineering principles of alignment, profile, grade, cross section, roadway and right-of-way width, drainage, and structural strength and durability. Most successful roadside work has been integrated with highway location and design, right-of-way acquisition, construction and maintenance. Improved highway location and design are necessary prerequisites for improvement in conservation of roadside features; improvement in shoulder, gutter, and drainage areas; better slope protection; safer and more convenient border development; better design and development of wayside areas for safety turnouts. Complete highway design considers all these roadside-development objectives and is based on good highway-department staff organization. The landscape engineer is one of a number of highway engineer specialists who are directly interested in, and responsible for, better roadsides. Success in highway landscape development requires teamwork within the highway department as well as public cooperation and support outside it. The practical advantages and service benefits of roadside development will be furthered in highway construction and maintenance programs through a better understanding of the importance of the roadside in the mind of every office and field employee in highways work."

A panel discussion on these three subjects was led by Torbert Slack.

Tree Types

Climaxing the successful two-day meeting, the final feature was the presentation of a "Treatise on Tree Types"—with illustrations—by Mr. Slack. This is a highly amusing and clever parody, satirizing careless and unintelligent tree trimming and other practices which result in the sling-shot tree, the question-mark tree, the doughnut and goblet types, and the sign tree.

Proceedings to be Published

Full transcripts of the papers and discussions of Louisiana's first short course on roadside development are being assembled and will be published in pamphlet form.

Sewer-Joint Compound

A new 4-page folder describing G-K sewer-joint compound has been prepared by The Atlas Mineral Products Co., 10 Pine St., Mertztown, Pa. It describes and illustrates melting, yarning, and pouring operations. A table

indicates the quantities of compound required for ASTM standard-type and west-coast-type joints, for sizes ranging from 4 to 36 inches in diameter.

This literature may be obtained from the company by requesting Bulletin No. M 20-1, or by using the Request Card at page 16. Circle No. 83.



When the World Needs a Lift

UNIT 357 on "earth moving" job, lifting globe into position at Midwest Fair exhibit.

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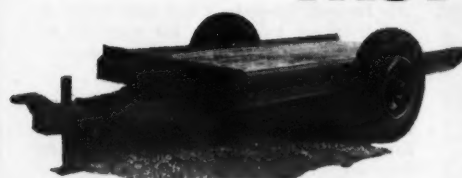
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Single Axle Trailers



The Bernz propane gas torch features a cylinder refill. It burns in both cold and warm temperatures.

Portable Gas Torch

A new hand-held gas torch featuring cartridge refills has been introduced by Otto Bernz Co., Inc., 280 Lyell Ave., Rochester 6, N. Y. The new LP (liquefied petroleum) gas torch is equipped with interchangeable burners to meet special needs and is said to light instantly in both cold and warm temperatures. It produces a pencil flame which adjusts from pinpoint size up to a 2-inch-long inner cone. The utility burner gives a brush-type flame adjustable from 2 to 4 inches.

The company reports that flame temperature reaches 3,660 degrees F. When the fuel cylinder is empty it can be unscrewed from the burner and a filled one substituted. The fully loaded cylinder weighs less than 2½ pounds. No tank, hose, or gages are required. The company points out that the torch will

burn in any position, making it especially useful for getting at inaccessible places.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 88.

Hand-Operated Hoist Handles ½-Ton Loads

A larger-capacity Mighty Midget Puller has been announced by the Coffing Hoist Co. of Danville, Ill. It is designed to handle a 1,000-pound load on lifting, stretching, or pulling jobs. The combination of portability and pulling power makes it useful as an extra hand around construction projects, the company says. It weighs 9½ pounds and can be carried from place to place.

The handle serves a double purpose. It may be used as a straight lever when loads are especially heavy or where lack of headroom allows only partial strokes; or the lower section may be locked at right angles to the upper section, forming a crank for high-speed lifting or pulling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 4.

Galion Allsteel Promotions

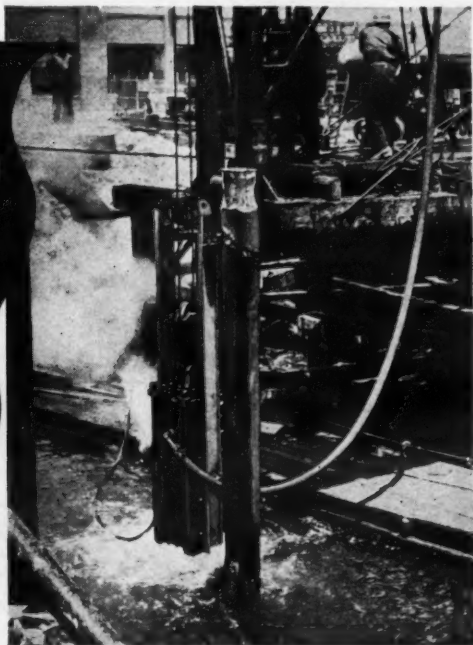
V. K. Gaston is Director of Sales and R. H. Stevens is Sales Manager for the Galion Allsteel Body Co., Galion, Ohio, a division of Central Ohio Steel Products. Mr. Gaston has been Galion's Western Regional Sales Manager for thirty years and Mr. Stevens has been Southern Regional Sales Manager for the past five years.



The new larger-capacity Coffing Mighty Midget Puller becomes an extra handy man around the shop—aids in servicing motor graders and other heavy machinery.

PILE DRIVING under water

McKiernan-Terry 11-B-3 Double-Acting Pile Hammer driving 85-ft. steel H-beams for the 4000-ft. bridge over Centos Channel. Terminal Island, Cal. Proctor & Kuhn, sub-contractors to United Concrete Pipe Corp.



1170 STEEL PILES had to be driven under water during the construction of this longest, highest vertical-lift bridge on the Pacific Coast. 390 steel piles, 85 feet long, were hammered full length, without follower, into unstable soil to required elevation. At cut-off the anvil block or base of the hammer was 12 feet below the surface of the water. In addition, 780 shorter piles were driven for the lift-span piers. • McKiernan-Terry Double-Acting Pile Hammers were chosen for the job because (1) they were the first pile hammers developed for underwater driving and (2) they have held an unsurpassed reputation for underwater driving dependability through the years. • 17 sizes of hammers and extractors are available in the complete McKiernan-Terry line. Write for bulletin giving all the facts.

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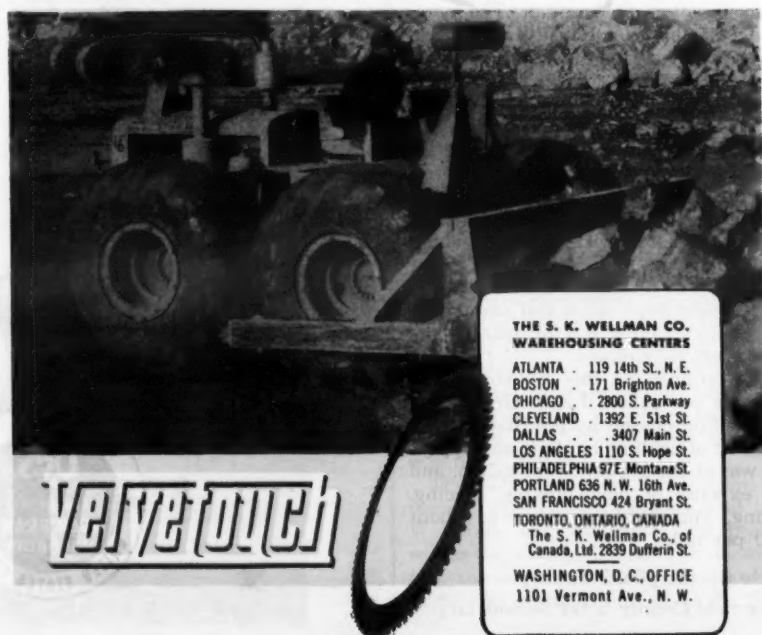
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All-metal Velvetouch friction discs, made from powdered metal compressed and fused with a solid steel backing, stop the powerful Super C...not once but thousands of times...to deliver the extra hours of dependable, trouble-free braking service that cuts operating costs. That's why leading earthmoving equipment manufacturers, like LeTourneau, use all-metal Velvetouch clutch facings and brake linings as standard. They know that Velvetouch lasts longer...BECAUSE IT'S ALL-METAL. And for the same reason, you should insist upon genuine Velvetouch replacement parts. They cost less in the long run!

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Floating Highway Has A Bituminous Surface

County Surfaces 11-Mile Stretch of U. S. 63 in the Land of Bunyan's Blue Ox, Wisconsin's Bibon Swamp

✦ TRAVELERS on U. S. 63, between Ashland and Grandview, Wis., ride for a while on a "floating highway". This recently relocated 11-mile stretch runs for about 4 miles through Bibon Swamp, the land of the Blue Ox and the home of Paul Bunyan. In the swamp area the road is supported by the tremendous side and upward pressure of marshland muck many feet below the road surface. During the relocation, thousands of tons of marsh material were excavated and replaced with earth fill which sank until the pressure from all sides was equal to that from above. Considerable irregular subgrade settlement is still taking place in the excavated areas of the Bibon Swamp.

County Does Surfacing

In August, 1949, Bayfield County undertook the bituminous surfacing of this road as a Federal-Aid construction job. Almost 2 years had been spent in subgrading, marsh excavation, building bridges, and placing a 12-inch sand-gravel fill or ballast on the subgrade, covered by about 3 inches of crushed gravel and primed with Wisconsin SC6 road oil. The road had been opened for traffic one winter, then lifted with 6 inches of crushed gravel and primed again with SC7 road oil. On this base, the county laid a 3-inch bituminous surface course using the blade-mix method.

The job used 168,000 gallons of Wisconsin type-SC7 asphalt and took about 20 working days. It was necessary to heat, unload, haul, apply, mix, and finish approximately one 10,000-gallon railroad car of bituminous material per day.

Equipment and Method

The following equipment was used: a Bros steam boiler to heat tank cars, a Bros direct heater and pump as a booster, three 1,000-gallon insulated supply tank trucks, one 1,000-gallon insulated Rosco distributor with a 12-foot spraybar mounted on a GMC 6 x 6 chassis, eight Caterpillar diesel No. 12 motor graders for mixing and placing, one Galion 10 to 12-ton tandem roller for finishing, and the usual small tools.

Dense graded crushed stone was windrowed upon the prime base at the rate of about 1,200 cubic yards per mile. This windrow was spread gradually in about ¾-inch layers and each layer was sprayed with 190-degree Wisconsin type-SC7 asphalt. The motor graders followed at once, mixing and again windrowing the material. This process continued until approximately 13 gallons of bitumen per cubic yard of crushed stone was incorporated in the mix; 10 to 12 lateral movements of the motor graders were usually required.

If the moisture content of the gravel was in the vicinity of 5 per cent, it was possible to process or mix about one mile per day with four motor graders—two preparing the mile ahead for the next day's work and two working behind, laying out or placing the mile previously mixed.

The bitumen on this job cost about 11 cents per gallon, f. o. b. Grandview, and was purchased by the State direct. The cost of heating, hauling, and applying was about 3½ cents per gallon, and the expense of blade-mixing, placing, rolling, and finishing came to about \$900 per mile.

Bayfield County

Bayfield County is the second-largest



A fleet of eight Caterpillar diesel motor graders owned by Bayfield County, Wis., blade-mixes bituminous aggregate on an 11-mile stretch of relocated U. S. 63 between Ashland and Grandview, Wis.

county in Wisconsin. About one-third of its total boundary fronts on Lake Superior to the north and east, and about one-half of its area is national or county forests. The forests and lake shore draw many vacationers every year. Aside from the tourist business, Bayfield is largely agricultural.

There are 171 miles of Federal and

state highways in the county and 180 miles of partly bituminous-surfaced roads which make up the county trunk highway system. Local roads and streets, approximately 1,700 miles, make almost any point in the county accessible.

The County Highway Department assumes responsibility for maintenance

and snow removal on the state system, in addition to certain construction projects on the state system similar to the bituminous surfacing of U. S. 63. It employs a permanent crew of about 50 men, supplemented by temporary employees during the short construction season, and it owns road equipment valued at \$250,000.

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REPLACE YOUR OLD BOOM SUPPORTS with these new Tiger Brand FATIGUE-RESISTANT Boom Support Assemblies. Field tests and laboratory vibration tests indicate at least two or three times the usual length of life under the most severe vibration conditions.

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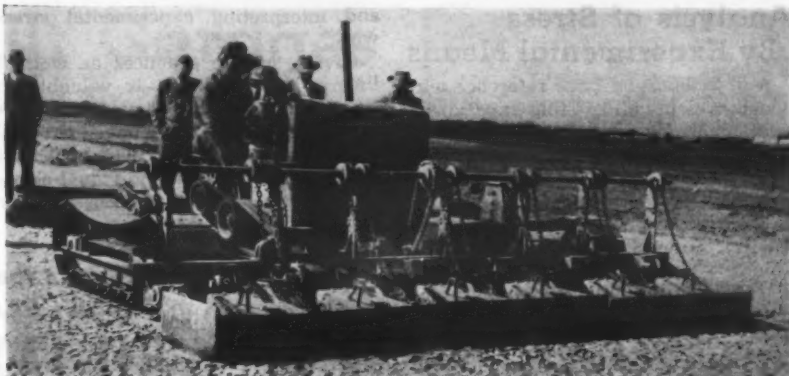


NEW TIGER BRAND FATIGUE-RESISTANT BOOM SUPPORT ASSEMBLIES on a 5 cu. yd. dragline near Pittsburgh, Pa.

Macadam Runway Base Laid in One Course

Original CAA specifications for waterbound-macadam base at Marion Municipal Airport, Marion, Ohio, stipulated the use of No. 12 stone in a bottom 4-inch course and No. 2 stone in a 3-inch top course. W. H. Ringwald & Sons Co., Inc., of Chillicothe, Ohio, held the \$495,033 contract for clearing, drainage, grading, and paving at the airport. And as Secretary-Treasurer E. B. Ringwald put it, "we were having a terrible time [with the base work] on account of the large stone".

Accordingly, the contractor made some experimental runs, placing the base in one 7-inch course and using a Vibro-Tamper to work screenings into the interstices in the coarse aggregate. Superintendent J. E. Greene found that he was getting more uniform compaction, with 8 to 10 per cent more screenings, and that his operations were speeded up 40 per cent. Field tests and visual inspection corroborated his



A Vibro-Tamper fills and nests a 7-inch macadam base course on the Municipal Airport at Marion, Ohio. W. H. Ringwald & Sons Co. of Chillicothe, Ohio was the contractor.

findings, and the CAA district airport engineer approved a change order permitting the base course to be constructed in one layer not over 7 inches in compacted thickness, and specifying that a Vibro-Tamper or similar equipment be operated over the surface until interstices were filled with screen-

ings to the surface of the course.

In this connection, it is interesting to note that the Civil Aeronautics Administration issued on February 1 of this year a supplement to its January, 1948, edition of standard spec for airport construction, in which it permits the use of single-course macadam bases.

Automatic Record Of Batch Quantities

A new device for recording weights on tape-drive dial scales has been developed by The Howe Scale Co., of Rutland, Vt. The Teleprint combines electronic, electrical, and mechanical devices to "read" the scale dial and convert it to weight-printings, set up on type wheels, for impression on a variety of tickets and forms, and on single and double-roll tapes. Three components make up the Teleprint: a takeoff unit mounted as part of the dial housing; a Servo-Amplifier; and a recorder unit remotely connected to the takeoff by cable.

The takeoff unit reproduces the dial reading and sets up the recorder to print the weight automatically when the scale comes to balance. The operator may push the button at any time during scale loading, and weight-printing will not be made until the scale comes to rest and correct balance is attained. With the takeoff and recorder mechanisms designed as separate units, the Teleprint recorder may be located 500 or more feet away from the scale site with only the addition of extra cable. It is completely flexible and can be mounted on a desk or portable stand, built in to control panels, or adapted elsewhere.

For use with Howe cabinet (drop-weight) dials, an additional feature of electric and remote operation of unit weights has been developed. Suitable interlocks are used to prevent printing until the correct number of weights are in the system; and a control panel allows the operator to control weight-printing entirely from remote location by indicating when weights are to be added or removed. With the cabinet drop-weight models, the Teleprint automatically adds and integrates the unit weight additions to print total weights.

Ticket-type Teleprints are designed so that printed weight figures may be placed anywhere on a sheet up to 15 inches long, 3/8 inch thick, and as wide as required. Ticket guides are available for single-stop, two-stop, and multi-stop for successive lines up to 45; correct positioning is accomplished by selecting the proper guide for the form being used. The Teleprint can reproduce up to seven ticket copies at one time, using standard-weight stock.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 72.

Youtz-Slick Method Licensed

The Youtz-Slick Lift-Slab building method has been licensed to James Stewart & Co. of New York, Dallas, and Chicago, by the Institute of Inventive Research, San Antonio, Texas. The construction company is licensed to use the method by which reinforced-concrete roof and upper-floor slabs are poured on the ground and then raised into place, and to supply the service to other contractors. The license issued to it is nonexclusive and purely domestic in nature.

ESCO Branches Move

The Spokane branch of the Electric Steel Foundry Co., Portland, Oreg., has moved to a new office and warehouse building at N. 1327 Washington St. The building, completed in June, is of steel and concrete construction with ample warehouse space and convenient parking facilities. N. J. Vanelli manages this branch. E. V. Wickey, former manager, is active in sales.

The Eugene branch in Oregon has moved, too. Its new offices are at 1464 W. Sixth St., Eugene. This branch serves the area from Salem, Oreg., south to Dunsmuir, Calif. It has a staff of six under the managership of L. F. Maxwell.

er life for boom supports

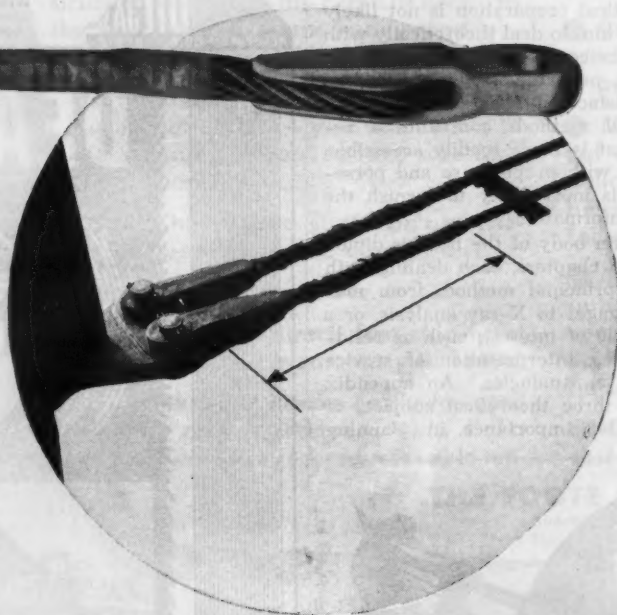
nt Tiger Brand Cable Assemblies

● Here is an "innovation" in boom support assemblies that effectively combats the most severe vibration on power shovels, draglines and cranes. Notice the novel thimble design which embodies an interwoven eye and open end pendant easily and quickly interchangeable on standard equipment.

This new design dampens vibration instead of concentrating it at one point. The result is two to three times longer life for boom supports and much greater safety.

The new boom supports are especially adaptable to installations where fatigue failures occur adjacent to sockets. They can be easily and quickly adapted to your present equipment because essential dimensions such as pin diameters, distances between ears, etc., are the same as for standard open and closed sockets.

Fatigue-Resistant Boom Supports are an exclusive development of American Steel & Wire Company. Send the coupon for complete information.



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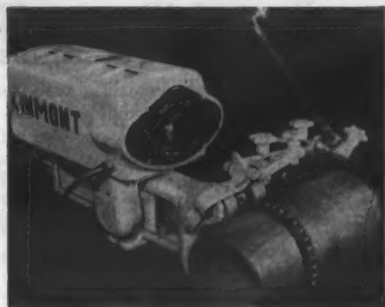
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The K-2095 pipe-scarfing attachment installed on a Kinmont power unit.

A New Attachment For Pipe Scarfing

A new pipe-scarfing attachment has been developed for the Kinmont universal power unit manufactured by Roylyn, Inc., 718 W. Wilson Ave., Glendale 3, Calif. This accessory makes it possible to cut or scarf pipe or tanks while they are being turned by the power unit. The attachment is installed through existing bolt holes without modification or the use of special tools.

Provision is made for vertical and horizontal adjustment of the cutting torch. A protractor dial provides for angular adjustment. The scarfing attachment is hinged so that the torch can be swung out of the way during work changes without disturbing the adjustments. The principal parts used in the attachment are heat-treated aluminum-alloy castings. Extension rods are steel. The 3/4-inch-ID torch tip holder is supplied with brass tip adapter bushings in sizes of 1/2, 9/16, and 41/64 inch. Other bushings of various diameters are available where necessary.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 28.

Asphalt-Transfer Pump

Data sheet 551B prepared by Rosco Mfg. Co., 3138 Snelling Ave., Minneapolis 6, Minn., describes four typical transfer pumps manufactured by the company. These units are designed for transferring bituminous materials from tankcar to supply car, bituminous distributor, or storage tank. They are available in 50 to 350 gpm-capacities.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 14.

Analysis of Stress By Experimental Means

A new thousand-page reference text which presents all existing experimental methods for determining mechanical strength has been written by 31 top-ranking stress analysts. This new handbook was prepared under the aegis of the Society for Experimental Stress Analysis with M. Hetenyi as Editor in Chief.

Mr. Hetenyi points out in his preface to the "Handbook of Experimental Stress Analysis" that "Many factors make the experimental approach indispensable . . . in the investigation of problems of mechanical strength. At our present state of knowledge it is remarkable how quickly we can reach the limit of applicability of mathematical methods of stress analysis, and there is a multitude of comparatively simple, and in practice frequently occurring, stress problems for which no theoretical solutions have yet been obtained. In addition to this, theoretical considerations are usually based on simplifying assumptions which imply a certain detachment from reality, and it can be decided only by experimentation whether such idealization has not resulted in an undue distortion of the essential features of the problem. No such doubt needs to enter experimental stress analysis, especially if it is done under actual service conditions, where all the factors due to the properties of the employed materials, the methods of manufacture, and the conditions of operation are fully represented . . . To these major advantages we may add one more, from the point of view of the average practicing engineer, whose mathematical preparation is not likely to enable him to deal theoretically with some of the complex strength problems which he, nevertheless, is expected to settle satisfactorily. To these men experimental methods constitute a resource that is more readily accessible, and that, with proper care and perseverance, is most likely to furnish the needed information."

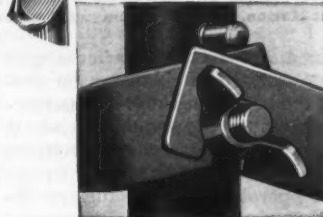
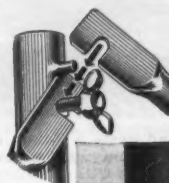
The main body of the book is divided into 18 chapters, each dealing with either a principal method, from mechanical gages to X-ray analysis, or a major topic of interest, such as residual stresses, interpretation of service fractures, or analogies. An appendix discusses three theoretical subjects of fundamental importance in planning

and interpreting experimental stress work.

Giving specific practices as well as theory, the handbook is valuable in furnishing heretofore scattered, incomplete material in one convenient and comprehensive volume. The book as a whole and most of the individual chapters are pioneering ventures in their

own right, often constituting the first systematic exposition of their respective subject matter.

Copies of the "Handbook of Experimental Stress Analysis" may be obtained from the publisher, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. The price of the Handbook is \$15.



Get up in the world faster with this BRACE LOCK, exclusive with BIL-JAX SCAFFOLDING

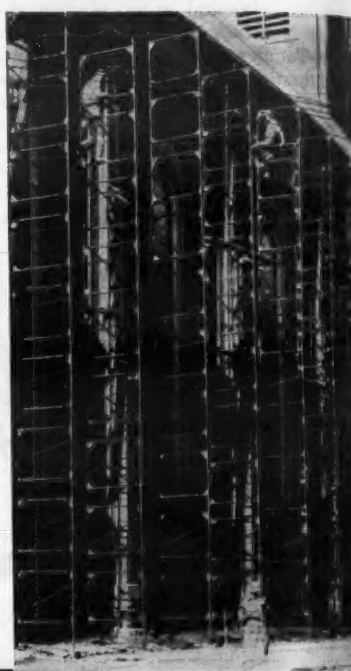
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Now . . . Bil-Jax takes only a fraction of the time needed to erect or dismantle ordinary steel scaffolding. Cross braces attach to end frames by merely placing slotted ends onto studs, then tightening wing nuts. Braces are removed by simply loosening wing nuts a few turns. It is never necessary to completely remove wing nuts, and no tools are required.



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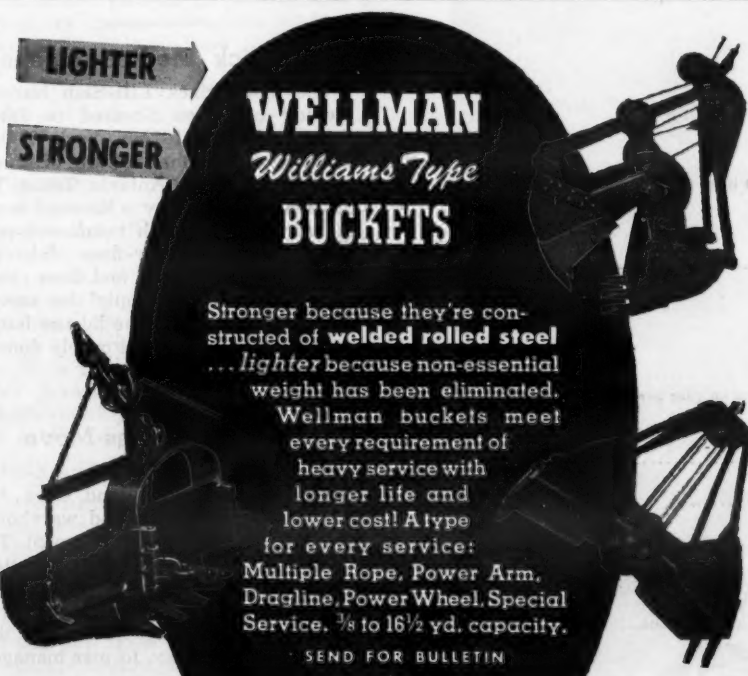
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Korte Brothers, 335 Murray Street, Fort Wayne, Indiana	Credle Equipment Co., Inc., Utica, N. Y.	Hawkins Equipment Company, Memphis, Tennessee
Conwell Equipment Co., Davenport, Ia.	Municipal Machinery Company, Coram, New York	A. H. Cox & Company, Seattle, Wash.
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Two City-Built Garages Ease Jammed Parking

Des Moines Lets Contracts for Two New Buildings as Parked Automobiles Glut Its Busy Downtown Streets

IF you were a city-traffic planner in a town of 160,000, and you couldn't even find a parking place in front of a meter, what would you do? Turn your head when your neighbors complained? Cry? Or correct the situation?

Well, city officials in Des Moines faced exactly that kind of issue. Cars glutted the streets. Traffic policemen wrote tickets until their arms got sore. Ultimately the situation became so acute that bonds were approved to make some changes.

Right now a construction miracle is happening. By the end of the year, when the contractors pay off the last workman, between 900 and 1,000 automobiles will disappear from the downtown streets. Instead they will be parked in the two modern garages the City is building by contract.

There may or may not have been other satisfactory solutions. Des Moines acted on this one in a hurry. Outside parking specialists were called in to work with Des Moines architects. They pooled their talents, and the fruit of the union is a pair of buildings downtown, right where the traffic problem was the worst.

No. 1: The Ramp Type

The first parking garage to get under way is a 4-story ramp-type affair at 7th and Mulberry Streets. Fane F. Vawter & Co. of Des Moines, with a few specialty subs, has this garage well along. By November 8, if all goes well, it should be ready for use. Vawter's contract is in the neighborhood of \$390,000.

The building is a reinforced-concrete structure built like a set of endless corkscrew stairs or ramps. It is almost a square building, 133 feet x 132 feet 7 inches. From the entrance on Sixth Street, 55-foot access ramps lead up toward the top floor, with level 40-foot-square corners to make turns easy. A ramp flight along one wall rises only 2½ feet. Automobiles—375 in this building—will park on the ramps. Present plans contemplate a double open lane along the inside of the ramp to bring cars in and take them out.

The building framework is heavily reinforced concrete columns and beams. There will be a safety wall at each level, but the outside of this building between floors is not to be enclosed by glass or the like.

The site had formerly been covered by several old buildings, but they had been wrecked. Much of the debris remained, though some had been hauled away. Vawter looked at the rubble and decided to subcontract foundation excavation to Charles Stewart. It was about the best move he could figure.

Stewart sent in a Thew-Lorain 1-yard dragline, after experimenting with a smaller rig. Five 5-yard dump trucks

were the hauling units. Working from the street level, the dragline squatted on its tracks sideways to the digging, and sliced one course after another from the foundation excavation block.

Excavated material went out to a disposal area in the southwest corner of the city. Debris of this kind is always valuable for fill, and people were glad to get it. Later on, parts of the foundation had to be backfilled with compacted dirt. Since the original material was anything but acceptable for that purpose, Stewart's men had to haul sand in. It was dumped and dozed; then flooded for compaction.

Excavation pointed out a major headache. There wasn't enough room. Trucks loaded with reinforcing steel

(Continued on next page)



C. & E. M. Photo

Early construction on the Vawter job, with a concrete-placing crew busy at left.

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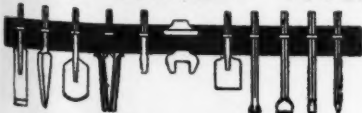


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12 LIME STREET ROCKLAND, MAINE

Two City-Built Garages Ease Jammed Parking

(Continued from preceding page)

and other materials soon didn't have a place to unload. Sometimes they had to unload at a secondary yard, and the material had to be transferred a second time. Vawter had reckoned with those conditions, but that didn't stop him from trying to schedule materials so their arrival would shave handling costs.

He had quite a time figuring the concrete forms, too. With most of the rampwork on an incline, and some of the crossbeams sloped and cambered at the same time, he couldn't figure a square end on a form panel one time in ten. Many pours were similar enough so that form panels were definitely indicated, but it took some practice and close calculating before they began to fit without field alterations.

The panels were made in a tiny carpenter yard at the site. In was sand-



C. & E. M. Photo

A closeup of concrete placing on the Vawter contract shows a Bell Prime Mover dumping its load of material. There were four of these buggies on the job.

wich in between the field office, the new building, a restaurant, and the Polk County Jail right across the alley. Four carpenters stayed busy 8 hours a day keeping out ahead with the panels.

Panels were built against 2 x 4 studs. Plywood facing was used where the concrete face would be to the outside where people on the street would see it. All inside work got plain wood sheathing, mostly yellow pine lumber, surfaced on all sides. The panels were strengthened by double 2 x 4 wales, and tied by Superior form ties. Ordinary smooth 4 x 4's were used as shores.

Construction began with the foundation and the low part of the main ramp. It continued by following on around until the wooden shores rested on the concrete ramp previously poured.

Placing Is a Problem

Until improved concrete-placing methods were invented, that particular operation caused considerable worry and high costs. Specifications called for a 3,750-pound-test air-entrained concrete, with a 4-inch slump. The maze of heavy steel reinforcement in beams and columns made it difficult—almost impossible—to place material as designed.

At first, truck-mixed concrete from Crown Concrete Co. was handled by hand-pushed buggies. It didn't work so well. It was all uphill. The most powerful man on the crew, a 240-pounder, groaned and grumbled.

Vawter switched methods then, and bought four Bell Prime Movers. These

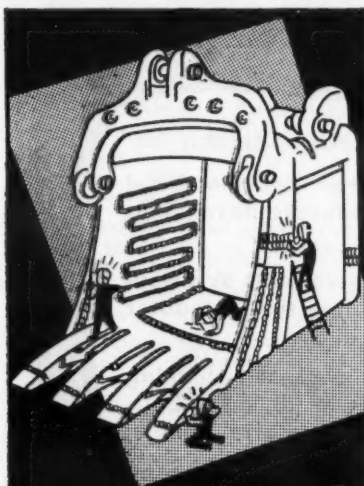
powerful little gasoline-driven buggies would take on a heavy load of concrete and drag the operator along too, if he kept his hold on the handles. Concrete-placing speed picked up, and costs dropped. How much is not for

this; it's part of the contract method.

The Bell Prime Movers needed a little heavier platform on which to run. Stubby, low sawhorses carried planked panels at right angles into the pour. Pours began at the wall line, generally, and ended at the inside of the ramp. As the concrete was dumped, two vibrator men worked it over with Mall gasoline-driven machines. The surface was finished by working a wooden drag across the top of steel-pipe screeds. They were set and checked for elevation before each pour. Following the screed-drag operation, the surface was hand-floated by a long-handled bull trowel. A Master power finisher put on the final surface. Wet sand was the curing agent.

Until Vawter analyzed and whipped the placing problem by using power equipment on those inclines, there was cause aplenty to suspect it was not a run-of-the-mill job.

The design of this building was
(Continued on next page)



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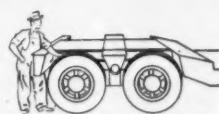
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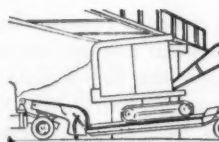
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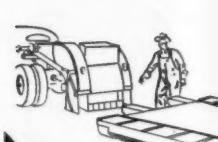
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C. & E. M. Photo
A Kucharo carpenter encloses wood column forms with Richmond steel ties.

masterminded by National Garages, Inc., of Detroit, with the help of Wetherell & Harrison, Architects, of Des Moines. Fane F. Vawter himself supervised much of the work, and active field supervision was done by Glen Baumgartner.

No. 2: The Elevator Type

The story shifts. We move now to the corner of Fourth and Locust Streets, five blocks away. "It's the only one of its kind in the country," the men say as they describe a different type of parking garage to you. Well, maybe.

This job is a little bigger, a little higher, a little more expensive. The contract: \$461,200. Builder: Kucharo & Associates of Des Moines.

The building's a lulu: 78 x 127 feet; 130 feet high or 9 stories. Capacity for 450 cars. Three traveling elevators that can pick up an automobile from street level and stow it away like a box of crackers on a grocery shelf, in less than a minute. How about that?

It has other features, too. A "ready apron", with room for 14 automobiles to leave at once. A "ready zone" that holds another 14. Floors sloped so drivers just drop their wheels in the dip, and take out without setting the brakes.

They call it the Bowser Parking System, and the traveling Montgomery elevators will be installed by Chenoweth-Kern Elevator Service. Dano Jackley, AIA, Baltimore, Md., was the supervising architect. Associated was Nemmers, Clark & Spooner, Associated Engineers and Architects, of Des Moines.

Again, it was a construction problem; a puzzle with excavation and forming and concrete. Some of the problems were similar to Vawter's. Many were different. Space was as limited and it was just as important to select the best methods.

Kucharo's superintendent Carl Mitchell handled excavation exactly the same way, even to the selection of the same make of dragline. This Thew-Lorain, however, used a 1½-yard can. Many years ago an old observatory building and theater were on the site.

These had been razed, and a 6-inch concrete pavement placed to form a parking lot. It wouldn't hold the 450 automobiles this new building will.

The pavement was demolished by a 1,000-pound steel breaking ball before the dragline bucket scooped out the main block of foundation debris. It was dump-trucked and disposed of at several locations in the city.

The concrete-forming problem on Kucharo's job was somewhat different from Vawter's. On the elevator-type building there were more vertical walls, more heavy spandrel beams. For the major part of forming, Kucharo chose 4,500 square feet of Atlas Speed Forms — steel panels with patented steel fasteners.

For vertical columns and spandrel beams, Kucharo used wood forms similar to those on the other job. Approximately 600 RooShors were used instead of 4 x 4's for shores, and the forming hardware was all Universal.

Where Darex AEA had been used on (Concluded on next page)



C. & E. M. Photo
Bow on row of RooShors appear in this snake's-eye view of Kucharo's \$461,200 job from the bottom of the elevator shaft.



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SEND for HM catalog, or literature on other Payloaders — the 1¼ yd. Model HL, the ¾ yd. HF, the ½ yd. HE, the 12 cu. ft. HA.



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Two City-Built Garages Ease Jammed Parking

(Continued from preceding page)

the other job to make the concrete more workable, Kucharo chose Pozzolith. Specifications called for 4,000-pound concrete at 28 days, with 2,500-pound concrete in footings.

Placing methods were somewhat simple, but adequate for the work. The foundation and walls were poured to street level by hand buggies, which took concrete from truck mixers at the edge of the pouring platform. The portion of the building above street level was then placed by hand buggies operating on pouring platforms and taking their concrete from a tower bucket. The wooden tower was supplied by concrete from a small 3-sack mixer. The tower bucket was hoisted by a gasoline-driven American hoisting engine. Dry material for the concrete batches came in from a commercial supplier, and the material was stored temporarily in small bins near the mixer. The mixer and tower were set up inside the elevator space.

With these exceptions, the remainder of concrete work was largely routine. The Kucharo building called for a steel-troweled finish inside, on the floors. Curing was done by wet sand.

Des Moines is due for a rare Christmas present this year if progress continues at the present rate. The Christmas present will be nearly 1,000 fewer automobiles parked in downtown streets, thanks to the construction of these two modern parking facilities.

Testing the Durability

Of Bituminous Materials

The American Society for Testing Materials has published a "Symposium on Accelerated Durability Testing of Bituminous Materials" which includes the 13 papers presented at two full sessions of the 52nd annual meeting of the ASTM, and the discussion which followed their presentation. The sessions were sponsored by Committee D-4 on Road and Paving Materials and Committee D-8 on Bituminous Waterproofing and Roofing Materials.

The papers deal with predetermining how long bituminous materials— asphalt, tar, and pitches—will withstand the effects of weathering. They touch on such factors as the effect of ultraviolet light, water, radiation, mineral stabilizers, characteristics of carbon-arc light sources, oxidation and evaporation, the use of an abrasion test, immersion-compression comparison with traffic tests and the design and application of a spark-gap instrument. A quantitative method of studying panel failure is included whereby a photographic record of failure is obtained. The changes that occur in exposures of bituminous materials in thin films, as binders in molded specimens, as well as in mixtures in a circular track, are compared with the changes that occur in these materials when subjected to the usual laboratory tests.

Copies of the 184-page publication can be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price: \$2.00.

Variable-Speed Drives

Variable-speed drives in 8 sizes and 16 types, in horsepower of ½ to 25, with manual and automatic controls, are illustrated and described in the new 88-page Book No. 2274 prepared by Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

A special feature of the new book is the convenience with which a P.I.V. of the right specifications for a specific service may now be selected directly from its 36 pages of "Preselected Drives". Diagrams of automatic speed-control applications, and pages of pho-

tographs showing a variety of P.I.V. installations in industry, are other features.

This literature may be obtained from the company by requesting Book No. 2274, or by using the Request Card at page 16. Circle No. 40.

Salvageable Sheeting

When you can use a construction material over and over again, that's a cost-cutting product. This is the reasoning followed in a 4-page folder prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio, on its steel sheeting. It reports that one contractor pulled and re-used his Armco sheeting more than 100 times. Other features of the product highlighted in the folder are easy driving, safe strength, and variety of uses. The sheeting is available in two types: flange in gages 12 to 3, and interlocking in gages 12 to 7.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 33.

Engineering Service

Offered in New Brochure

A new brochure has been prepared by Sam Tour & Co., Inc., 44 Trinity Place, New York 6, N. Y., which shows the work of scientists, engineers, consultants, and laboratory technicians of the company on various jobs. It explains the scope of the services available from this independent organiza-

tion and touches on such subjects as research, process development, product development, production methods, evaluations, expert testimony, investigations, nondestructive testing and inspecting, laboratory testing, and analysis. "All Under One Roof" is illustrated with action photographs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 26.

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S-type 4 to 10 cubic yards (struck) B-type 15 and 22 cubic yards (struck)

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S-113 10 cu. yd.

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See your International Industrial Tractor Distributor.
Ask about the 'BIG RED' team (TD-24 tractor and B-type scrapers) too!

Safety on the Job Is Responsibility of All

Committee on Labor-Management Cooperation for Safety Outlines Its Principles: It Stresses Joint Action to Secure Job Safety

THE job-accident problem can be solved only by full cooperation between the employer and employee, points out the Committee on Labor-Management Cooperation for Safety, of the President's Conference on Industrial Safety. There must be genuine participation on the part of all levels of management and employees in building and stimulating the safety efforts of the entire organization, the Committee's report states. This will produce understanding, pride in results, and an appreciation of the sincerity and good faith of each party to the program.

The Committee has approved the following principles as fundamental to achieving results:

1. Safety is primarily the legal and moral obligation of the employer. The employer must have a sincere and continuing interest in providing for the safety of employees. This interest is demonstrated by:

(a) The initiation of a sound safety program with the policies, procedures, and staff necessary to make it effective.

(b) The provision of safe working conditions, machinery and equipment, and personal safety protective devices and apparel where necessary.

(c) The development of effective training programs for supervisors and employees.

(d) The encouragement of employee interest and participation by making available channels through which employees may offer suggestions, advice, and recommendations for the improvement of safety.

Management must have the authority necessary to carry out its responsibility. No steps should be taken which create confusion and uncertainty as to management's responsibility and authority.

2. Cooperation in the safety program is the moral obligation of each individual employee. This is demonstrated by:

(a) Working safely at his job.

(b) Having regard at all times for the safety of fellow employees.

(c) Using his knowledge and influence to prevent accidents.

(d) Calling attention to unsafe conditions.

(e) Contributing his ideas, suggestions, and recommendations for the improvement of safety.

3. In unionized plants the welfare of the employees places upon the labor union a moral obligation to cooperate in accident prevention, within the framework of its agreed-upon participation. This is demonstrated by:

(a) Taking its agreed part in the safety program in the plant.

(b) Using its influence in encouraging the employees it represents to work safely.

(c) Promoting accident prevention through its publications, union meet-

ings, and educational courses, with emphasis not only upon plant safety but also with due regard to safety in the home, on the highway, and in other activities outside the plant.

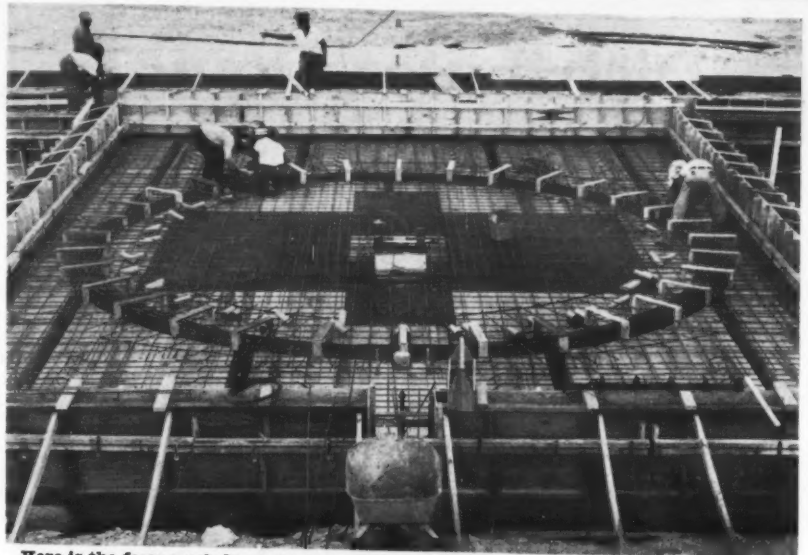
Copies Available

A limited supply of copies of these principles is available. They may be secured from the President's Conference on Industrial Safety, U. S. Department of Labor, Washington 25, D. C., or from this magazine.

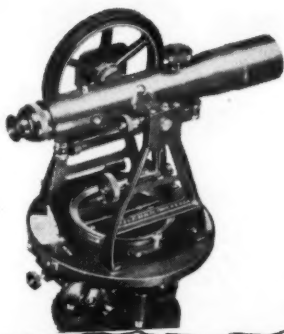
Spex on Scaffolding

An 8-page specifications catalog on the Waco sectional scaffolding has been prepared by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave, Minneapolis 16, Minn. It covers typical job assemblies, load tests of equipment, safety rules, assembly parts, methods of assembly, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 71.



Here is the form work for a revolving-stage slab in Miami's million-dollar Dade County Auditorium which Caldwell-Scott, of Fort Lauderdale, Fla., is building. The ring beam sides are formed with Masonite. The inserts shown are for anchor bolts to fasten the steel circular rail to the concrete slab.



WHAT A LEADING TECHNICAL EDITOR WROTE ABOUT ALUMINUM TRANSITS AFTER ANALYZING HOW GURLEY MAKES THEM

Reproduced from a full-length article in the December 1949 issue of MATERIALS & METHODS, written by H. R. Clauser, its Associate Editor. We will gladly send you reprints of the entire article on request.

Aluminum Used Successfully in Precision Instruments

A PICTORIAL STORY

Requirements of accuracy during a long service life are controlling factors in selection of materials for engineering and surveying instruments.

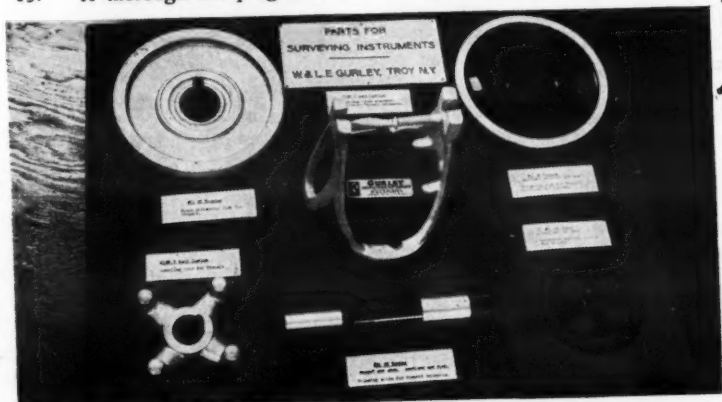
● IN THE MANUFACTURE of precision instruments, the selection and careful processing of materials is of prime importance. Accuracy as well as long service life with a minimum of adjustment and repair are the quality standards that must be met, and to meet them, astute materials engineering coupled with expert workmanship are required. Perhaps no better example of the combination of these two factors can be found than at W. & L. E. Gurley, Troy, N. Y., where precision instruments are produced not only for engineering and surveying, but also for other fields such as meteorology and aeronautics.

Copper alloys and aluminum alloys are the principal materials used in the company's surveying instruments. One of the earliest uses of aluminum in this country was in a Gurley transit 73 years ago. And since that early application, aluminum has proved satisfactory in an increasing number of instrument parts. The main reasons for adopting the use of aluminum were: (1) light weight; (2) relatively high strength and yield point; (3) lends itself to precision

machining; (4) good ductility; (5) relatively good corrosion resistance, especially in sulfur atmospheres; and (6) does not distort nor "grow" with age. The aluminum alloys most used at present are 14SW, 61ST, 356 and 13. A thorough test program in-

cludes against any differences in accuracy within a temperature range of -80 F and +165 F.

The accompanying pictures illustrate a number of the steps involved in the production of various parts making up the transit.



1—Shown here are the aluminum parts used in Gurley surveying instruments. At top, left and right is a 14SW forging for a horizontal transit limb before and after being machined, anodized and dyed. In the center is a sand casting of 356 alloy for the truss standard. Lower row, left to right, is a transit leveling head sand casting of 13 alloy, a swaged and spun tubing for telescope focusing slide of 51ST alloy, and a graduated vertical circle made of 61ST aluminum sheet which has been anodized and dyed.

You're So Right, Mr. Editor—

The first Gurley Aluminum Transit, built in 1876, was finally retired after 50 years of active service—and then for sentimental reasons only. It met every field "requirement of accuracy during a long service life"—as every Gurley Transit continues to do all over the world.

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New York, N. Y. Chicago, Ill.

Distributor Doings

New Plant for Southern Dealer

R. S. Armstrong & Bro. Co. of Albany, Ga., one of the most recent additions to the Littleford dealer organization, has just opened a new and attractive equipment show place.

Five Dealers for Maginniss

Maginniss Power Tool Co. of Mansfield, Ohio, announces the following distributor appointments: Builders' Equipment & Supplies, West Medford, Mass.; W. I. Clark Co., New Haven, Conn.; John C. Louis Co., Baltimore, Md., and Washington, D. C.; Day & Maddock Co., Cleveland, Ohio; and A. H. Cox & Co., Seattle, Wash.

Eastern Stooddy Dealers Named

Stooddy hard-facing alloys can now be obtained from the following eastern local dealers, announces Morris, Wheeler & Co. of Philadelphia; in northern New Jersey, Charles W. Krieg Co., 52-60 Dickerson St., Newark; and in southern New Jersey, Millville Iron Works, Millville. Butler Cylinder Gas Co., 832 N. 8th St., Reading, serves the central part of eastern Pennsylvania; Mitchell Welding Supply Co., 937 Jefferson Ave., Scranton, serves northeastern Pennsylvania; and "Lewie" Kerchner, 402 N. Queen St., York, serves south-central Pennsylvania.

Dealers operating in metropolitan New York and Long Island are New York Welding Supply Co., 72 Grand St., New York City; Rayno Distributors, Inc., 1065-67 Atlantic Ave., Brooklyn; Long Island Welding Supply Co., 274 E. Main St., Patchogue, Long Island; and Prest-O-Sales & Service, Inc., 29-23 Fortieth Road, Long Island City. Tri-States Welding Supply Co., Sussex, N. J., is operating in the New York counties of Sullivan, Orange, and Rockland; in northern New Jersey; and in Pike County, Pa.

Hunt Machinery Alters Plant

The Jeff Hunt Machinery Co. has completed an extensive program of alterations and additions on its Columbia, S. C., plant. The firm also maintains offices at Charleston and Greenville, S. C.

Sandberg Handles Nelson Products

N. H. Sandberg Erection Co., 244 E. 9th St., St. Paul, Minn., is an authorized sales, rental, and service dealer for Nelson stud-welding equipment and an approved applicator for the Nelson stud-welding method of installing all types of corrugated and flat roofing and siding, metal deck, and insulation. The firm is also authorized to do contract welding of studs to boilers and other construction applications.

The franchise issued by the Nelson Stud Welding Division of the Morton Gregory Corp., Lorain, Ohio, covers the states of Minnesota, North and South Dakota, and the Superior, Wisconsin, trading area.

Takes on Concrete-Mixer Line

Rhodes & Jamieson, Ltd., 23rd Ave., Oakland, Calif., has signed a distributorship agreement with Worthington Pump & Machinery Corp. for handling Worthington-Ransome truck and big building concrete mixers. Rhodes & Jamieson, Ltd., has been in business since 1903 and has been supplying ready-mix concrete plants and contractors in northern California with construction equipment since 1938.

Republic Rubber Distributors

The Southern Marine & Supply Co., 10 E. Bay St., Savannah, Ga., and the Wetzel Equipment Agency, 375 S.W. Temple, Salt Lake City, Utah, are accredited distributors for the Republic Rubber Division of Lee Rubber & Tire

Corp., Youngstown, Ohio. They carry a representative stock of Republic's industrial rubber products.

Frantz Opens on Long Island

Frantz Tractor Co. of New York City recently opened a new branch office in Hempstead, Long Island, to serve the island and part of Brooklyn and Queens. R. W. Long is Manager of the new plant and he is assisted in sales by Bill Flore. Bernie Puff is Service Manager and Stud Wyman is Parts Manager.

A-C Dealer in Winnipeg

Vulcan Machinery & Equipment, Ltd., Winnipeg, Canada, now handles industrial equipment for the Tractor Division of Allis-Chalmers, Milwaukee, Wis., in Manitoba and northwestern Ontario.

(Concluded on next page)



Dallett's Contractor Tools

ASPHALT CUTTERS

MOIL POINTS

GADS

DIGGING CHISELS

DALLETT'S Line of Contractor Tools are made under rigid standards and from material best suited for their intended applications. Dallett's quality tools will always give top performance.

Write for Bulletin C-220



CLECO DIVISION

of the REED ROLLER BIT COMPANY, 5125 Clinton Drive, Houston 20, Texas, U.S.A.

Flame Cleaning

prepares bridge members for painting

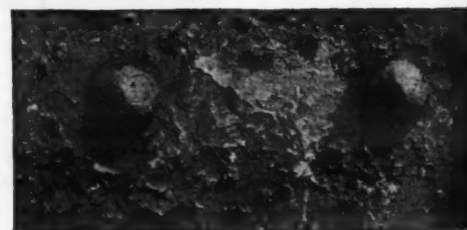


Leading engineers find that flame cleaning quickly prepares bridges, trestles and other metal surfaces for painting—with savings up to one half the cost of hand scraping and chipping. Further, in addition to actual dollar savings, they found that the flame cleaned surface produced a better finished paint job.

Quickly, easily and safely applied, the Airco flame cleaning process provides a clean, warm and dry surface conducive to a lasting paint job. The oxyacetylene flame cockles old paint, loosens scale and drives off hidden moisture . . . gives longer paint life to all kinds of steel structures.

New steel structures, too, should be flame cleaned before application of the prime coat of protection. This method loosens semi-tenacious mill scale and leaves no corrosion-starting dirt or hidden moisture. Future maintenance costs are reduced to an absolute minimum.

For further details write for folder ADG-1066B — "Flame Cleaning and Dehydrating Old Steel Structures", and folder ADG-1067A — "Flame Cleaning and Dehydrating New Steel Structures". Write your nearest Airco office.



BEFORE — Close-up view shows conditions of paint-lift heavy rust and scale that were met.



AFTER — The finished job after flame cleaning. A smooth, clean, dry surface ready for a lasting coat of paint.



AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

Distributor Doings

(Continued from preceding page)

The new dealer is a division of Vulcan Iron & Engineering, Ltd., an organization which has been serving Canada for over three-quarters of a century.

An experienced staff, service facilities, and a completely stocked parts department are supplied by the dealer, who will handle, in addition to A-C products, a full line of allied equipment.

Rish Delivers 100th TD-24

On August 9, Rish Equipment Co., International Harvester industrial power distributor, celebrated the delivery of its 100th International TD-24 crawler tractor to Coleman & Gay, West Virginia road-building contractor.

Rish has six plants serving West Virginia, Virginia, and portions of Ohio and Kentucky. This celebration took place at its Charleston, W. Va., plant.

Riddell Distributor in Minnesota

The Ruffridge-Johnson Equipment Co., 250 10th Ave., S. Minneapolis, Minn., now handles the sales and service of Warco motor graders and Hercules road rollers in Minnesota. The Warco-Hercules line is made by the W. A. Riddell Corp., Bucyrus, Ohio.

Four Full-line Dealers for Davey

The Davey Compressor Co., Kent, Ohio, has appointed four new full-line dealers: The Boardman Co., Oklahoma City (state of Oklahoma); Pacific Tractor & Equipment Ltd., Vancouver (Yukon territory); Republic Power & Equipment Co., Decorah, Iowa (eastern Iowa); and Stanley Marks Tractor Co., Maumee, Ohio (vicinity of Toledo).

Midwestern Loses Bost to Army

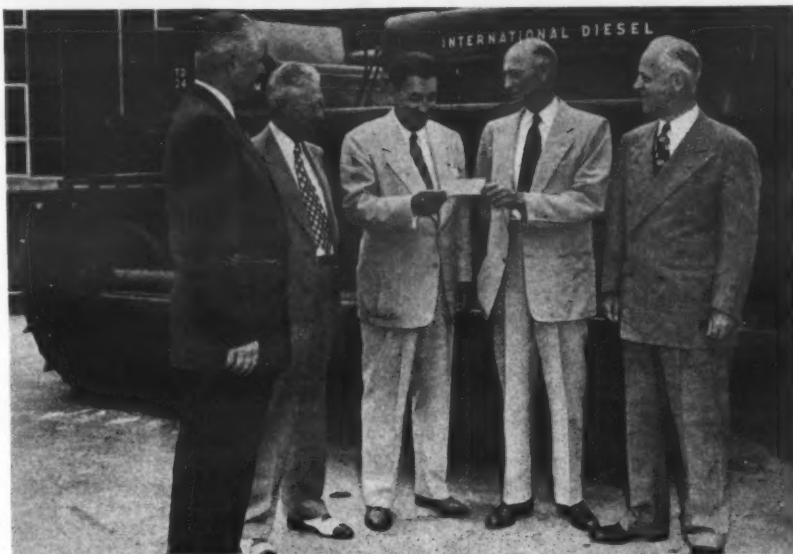
Armor H. (Jack) Bost, Vice President and General Manager, Midwestern Engine & Equipment Co., suspended his duties with the company on September 15 and again assumed his work with the United States Army as commanding officer of a large logistical unit. Colonel Bost, Ted Murray, and Jack Glandon were among the original organizers of the Tulsa pipeline and construction-equipment supply house in 1946, and they subsequently bought out all other major stockholders. Continental engines, Unit cranes and shovels, and Barnes pumps number among Midwestern's lines.

Murray and Glandon will continue the company's normal operations during Bost's absence.

Green Co. Represents Huber in Pa.

Huber Mfg. Co. of Marion, Ohio, has announced the appointment of A. T. Green Co. of Glenshaw, Pa., as distributor of the complete line of Huber road-building and maintenance machinery. The firm will represent Huber in seventeen western Pennsylvania counties and in Hancock, Brooke, Ohio, and Marshall Counties in West Virginia.

Headquarters of the Green concern are on Route 8 in Glenshaw. A. T. Green is President, J. A. Rafferty is Sales Manager, and A. W. Hamilton is Parts Manager.



Contractor L. S. Coleman accepts delivery of Rish Equipment Co.'s 100th TD-24 from President Lon M. Rish and Vice President "Andy" Anderson, while International Harvester officials Peter V. Moulder and A. J. Peterson look on.

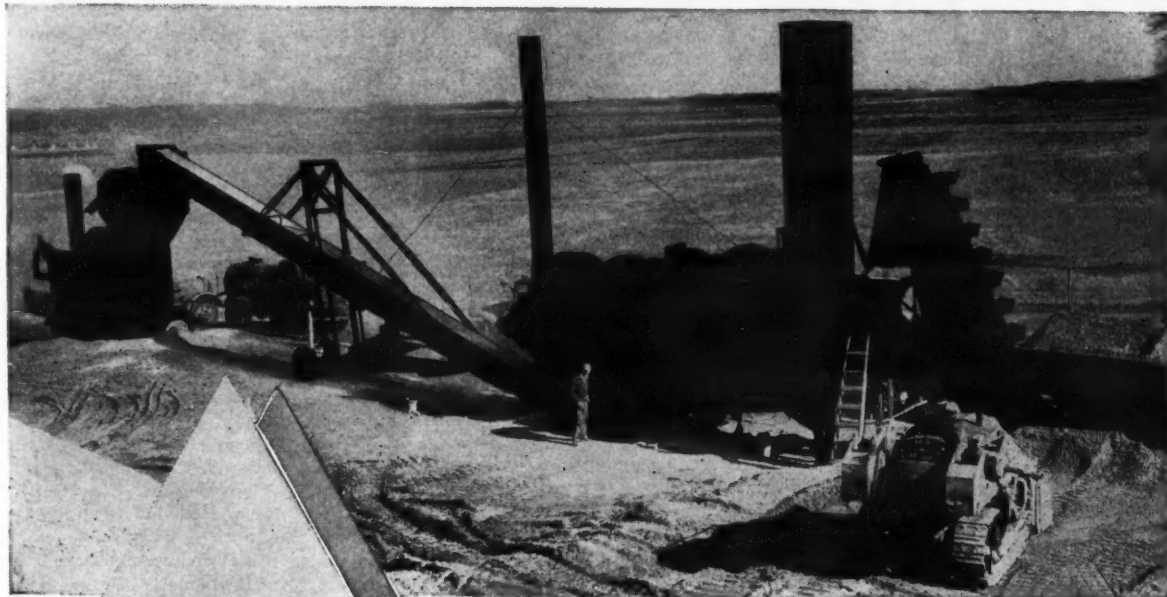
Carbide-Tip Blade For Portable Saws

Special carbide-tipped blades for Quick-Saw portable electric saws have been introduced by The Black & Decker Mfg. Co., Towson 4, Md. They are designed to cut faster than abrasive disks when sawing Transite, Cemesto Board, Masonite, Formica, and other abrasive or plastic composition materials. They give a smoother cut in wood than steel blades, the company claims, due to the special tooth design and number of teeth. They are said to stay sharp a long time and lose little diameter in the resharpening process.

Carbide-tipped Quick-Saw blades are available in three sizes: 7-inch (18-tooth), 8-inch (20-tooth), and 9-inch (22-tooth). They are designed to fit all recent-model Black & Decker Quick-Saws.

Further information on these new blades may be secured from the company. Or use the Request Card at page 16. Circle No. 47.

Barber-Greene



High-Capacity "Intermediate" Mixing with Portability

Here's the B-G "Intermediate" Bituminous Mixing Plant that combines the convenience of true portability with the basic advantages of the B-G Bituminous Mixing System*. You can tow the units you need to the job, right to the spot that's most convenient and economical from the standpoint of aggregate source and need for finished mix.

In its accuracy the B-G "Intermediate" Plant bridges the gap between the B-G "High-type" and B-G Travel Plant. Capacity is from 80 to 120 tons per hour. It is used principally for single-aggregate mixes; however, an optional 2-compartment charging Bin, with B-G 2-gate Reciprocating Feeder, provides a method of feeding a fine and coarse aggregate where rigid aggregate gradation is not required. For details, write for literature, or see your B-G representative.

*THE B-G BITUMINOUS MIXING METHOD: Continuous flow, with measured volumetric aggregate content, metered bitumen supply, controlled temperature, and thorough twin-pugmill mixing—through flexible, coordinated portable units. Barber-Greene Company, Aurora, Illinois.

The B-G Tamping-Leveling Finisher will lay any mix, hot or cold. Places a continuous ridge-free surface with each succeeding strip firmly compacted against the previous one.



BARBER-GREENE COMPANY • AURORA, ILLINOIS

Constant Flow Equipment



GRIFFIN
WELLPOINT SYSTEMS
JETTING PUMPS
.....
GRIFFIN WELLPOINT CORP.
881 E. 141st ST., NEW YORK 54, N.Y.
TEL. ME. 5-7704

Heavy-Duty Trucks

A new truck designed and engineered for heavy hauling has been introduced by Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles 31, Calif. It is powered by a 6-cylinder Continental valve-in-head engine that develops 198 hp at 2,600 rpm.

The features of the new truck include a 5/16-inch alloy-steel frame 10 inches deep with 3 1/2-inch flanges. The wheelbase on the new model is 191 inches. A full-floating double-reduction axle with a rated capacity of 20,000 pounds, together with a Fuller 5-speed transmission and 3-speed gear-splitter auxiliary transmission, is said to provide a wide range of speed for operations on or off the highway. The truck has Westinghouse air brakes.

The manufacturer highlights use of the C12 truck as a tractor for hauling large semitrailers. It is available with either single driving axle plus a third axle if desired, or a dual gear drive. The truck is designed to carry a pay-



This is Cook Bros.' new C12 truck with a lightweight high-tensile-strength steel dump body and a hydraulically powered transfer trailer.

load of 15 tons—26 tons with the trailer. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 65.

New Tracing Table

A new adjustable tilt-top tracing table with fluorescent back lighting has been developed by Stacor Equipment Corp., 1887 Atlantic Ave., Brooklyn 33, N. Y. Featuring all-steel construction, the table is available with tracing surfaces of 20 x 25 or 24 x 36. The working surface is smooth glass and the underside is sand-blasted for diffused lighting. Adjusting devices raise or lower the tracing surface to a comfortable working angle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 13.

Harnischfeger News

Several new appointments have been made lately by Harnischfeger Corp. of Milwaukee. Ervin C. Brekelbaum, Executive Chief Engineer since 1946, has been appointed Vice President in Charge of Engineering. A. L. Stanley has been named District Manager of the company's Minneapolis territory.

A new branch office has been opened in the Wilson Bldg., Syracuse, N. Y., to direct sales in upper New York north and west of Sullivan, Ulster, and Dutchess Counties. J. F. Catalane is District Manager of the new branch. Another new office has been opened in Roselawn Center Bldg., Cincinnati, to handle sales of P&H hoists and cranes. W. T. Spelius heads the office, which is under the jurisdiction of the Pittsburgh branch office.

High Speed Concrete Vibrators



The Dart Model 100 EH "Mid-Jet" portable hand model

The "Mid-Jet" is ideal for small form work such as porches, decks, etc. Also fine for vibration around steel reinforcing with 1 1/8" or 1 1/4" head. Shoulder strap and trigger switch make 1-man operation simple.

See Dart gasoline and electric models at your Dealers or write for free literature.



1246 Champa St.

Manufacturing & Sales Co.
Denver, Colorado



PREVENT
COSTLY
Cave-Ins
WITH

DUFF-NORTON

TRENCH
Braces

Make Trenches Safe for Workmen

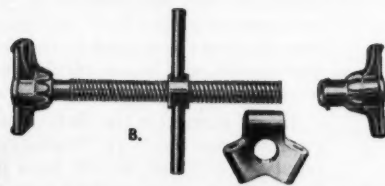
Unexcelled for safe and economical bracing of all trench and excavation jobs... Duff-Norton Trench Braces are of strong construction... easy to install, easy to maintain when not in use. Write today for full information and proposal on your requirements.



A. This type is supplied complete with pipe (1 1/2" or 2") in lengths from 16" to 60" to suit your needs.

B. Steel fittings only are supplied without pipe if desired. Used with 1 1/2" and 2" pipe.

C. Steel timber brace fittings are furnished without timbers for use with 4" x 4"—6" x 6" and 8" x 8" timbers.



See your local
distributor or
write for
Catalog 203-D



THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

Phillip C. Petry has been transferred from Milwaukee to the company's Philadelphia branch where he will represent the full line of P&H welding equipment. William H. De Huff is now Excavator Sales Representative in the Chicago office, and will cover the states of Indiana and Kentucky. K. J. Splude has joined the sales staff of the St. Louis office.

Idlers Eliminate Rattle

Two folders on troughing idlers and return idlers said to eliminate high-speed rattle are available from The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif. Covered in the pamphlets are features of the new design and its application to permanently lubricated ball-bearing-type idlers and roller-bearing idlers. Each type of troughing idler is designed for specific fields of use.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 49.

ROSCO
MINNEAPOLIS

ROAD and STREET CONSTRUCTION
and
MAINTENANCE EQUIPMENT



BITUMINOUS DISTRIBUTOR... Strokeless application with pressure constantly and automatically maintained.



STREET FLUSHERS... Truck mounted or 2-wheel trailer type. Standard or custom built.



MAINTENANCE UNIT... For repair and secondary construction. Truck or trailer mounted.

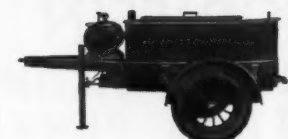


STREET CLEANER... Settles dust as it cleans. Sweeps and washes the street.

OTHER ROSCO PRODUCTS: Road brooms—fraction or powered... for kettles... power pumping units.

ROSCO MANUFACTURING CO.
3118 SNELLING AVE. • MINNEAPOLIS 6, MINN.

Ask Your ROSCO DEALER or write the factory for literature.



ROSCO TAR KETTLE

For heating and melting asphalt, pitch and all types of bituminous materials. Welded all-steel construction.

Road Grading Heavy Through the Smokies

Over 500,000 Cubic Yards Of Excavation Are Involved In Recent 5-Mile Contract in East Tennessee

THE State of Tennessee, Department of Highways and Public Works, is constructing a modern highway through the Great Smoky Mountains on the western fringe of the National Park. Now under way is a 5-mile grading, drainage, and bridge contract on State Route 73, beginning at Gatlinburg in Sevier County and running northeast to Little Pigeon River. The new highway, mostly on new location, will replace a 16-foot gravel road that continues to Emerts Cove and Pittman Center. It is expected that eventually the new highway will be extended 8 miles in to Newport from its present terminus.

Work got started last April after the Department of Highways awarded the project to Nello L. Teer Co. of Durham, N. C., on a low bid of \$389,394. It is scheduled for completion in November. The principal item in the contract is 529,841 cubic yards of grading, either sidehill excavation or moving dirt from the deep cuts to make the high fills. The two different phases of grading involve about equal yardage. Cut and fill quantities almost balance out, with but a small amount of borrow being required to complete the roadway embankments.

The new highway cross section will have a 37-foot roadway, on which a 24-foot pavement will be laid in some future contract. It will be flanked by 6½-foot shoulders; in cuts the ditch line is 5 feet wide. Cut slopes vary from ½ to 1 in rock to a flat 5 to 1 in earth. Low fills also have 5 to 1 side slopes which increase to a maximum of 1½ to 1 on high embankments.

Drainage

Three bridge structures included in the contract were sublet to the Garrett & Ferris Construction Co. of Knoxville, Tenn., which proceeded with its work simultaneously with the grading. The structures are all reinforced-concrete box-culvert types, one with three spans, 10 x 7 feet, and the other two with two spans, 10 x 7 feet.

Over 16,000 yards of channel excavation was handled by the prime contractor in realigning the courses of Dudley Creek and Hills Creek at opposite ends

of the project. Practically all of this channel work was in rock, which was removed by drilling and blasting. Drill holes were opened up with a pair of Gardner-Denver wagon drills with three G-D compressors available for supplying air. Two of the compressors were 500-cfm units, while the third was a smaller model at 105 cfm.

Drill steel, 1¼ inches in diameter, was used in the wagon drills in lengths of 6, 12, and 18 feet. The longest length was used only occasionally, since the bulk of the rock was taken off in 10-foot lifts to permit easy trimming of the banks by graders and dozers. Timken bits were used, from 2½ down to 2-inch size. Little real wear of grinding surfaces was experienced since most

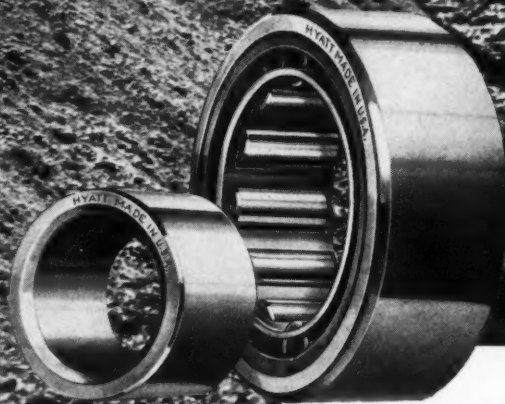
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C. & E. M. Photo

In the Great Smoky Mountains, a TD-24 and LeTourneau W Carryall haul material from cut to fill. Most of the excavation was either clay or shale.

Digging Ditches deeper and faster

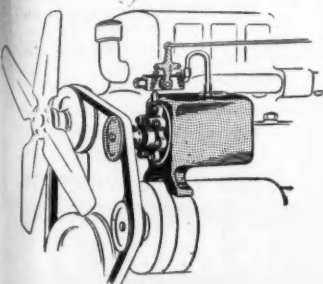
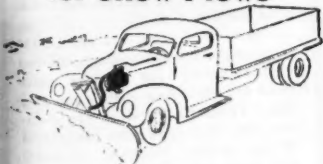


The Hyatt Roller Bearings in the transmission of Buckeye Traction Ditchers provide high-load carrying capacity, long life, quiet operation, minimum power and maintenance requirements and wide flexibility in design and assembly procedures.

Built by Garwood Industries, this ingenious machine digs ditches deeper and faster with the assurance that its Hyatt equipment will help keep it on the job continuously.

Because both machinery builders and users have come to realize that when Hyatts go in, bearing wear and care go out. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

POWER HYDRAULICS for Snow Plows



• THOUSANDS IN USE • FIT ALL TRUCKS
• FAN BELT OR ELECTRICALLY DRIVEN
MODELS • CLUTCH MODELS NOW
AVAILABLE
• Write Hydraulic Division
MONARCH ROAD MACH. CO.
223 North Front Ave., Grand Rapids 4, Michigan

HYATT ROLLER BEARINGS

Road Grading Heavy Through the Smokies

(Continued from preceding page)

of the rock was shale, with only a small amount of the harder traprock being encountered. Blasting was done with Atlas 40 per cent dynamite.

Pipe for drainage included 2,000 linear feet of concrete pipe from 18 to 30 inches in diameter for side drainage to accommodate intersecting approaches, and 600 linear feet of 18-inch corrugated-metal pipe.

Dirt-Moving

Most of the roadway excavation was either clay or shale, the latter soft enough for cutting with dozer blades and scrapers. The sidehill cuts were made chiefly with three International TD-24 tractors equipped with angle-blade dozers, since the hauls on such work were usually short. On hauls of greater length, the contractor employed three LeTourneau Model W Carryalls,



C. & E. M. Photo
John L. Carrickhoff (left) was the Nello L. Teer Co. Superintendent on the Tennessee grading contract. At right is Don Tucker of Power Equipment Co., Knoxville, Tenn.

18-yard capacity water level and 22 yards heaped. These units were pulled by three other TD-24 tractors, which were helped in loading by the other dozers acting as pushers when necessary.

The tractor-scraper units worked rather long hauls, ranging from 1,200 to 1,800 feet. Over the latter distance, the three units moved an average of 3,500 cubic yards of material in a 10-hour day. Cuts and fills reached a maximum of 100 feet in height on this job, with the haul roads often starting out with a maximum grade of 7 per cent. The dirt-moving pattern was so laid out that the loads were moved downhill, the empty returns going uphill.

Still longer hauls were handled with Koehring Dumpsters, averaging 6 yards a load. At the beginning of the contract, a fleet of four such units was on hand. Later the contractor brought in two more, and added three 16-yard bottom-dump Euclids. Haul lengths with this rubber-tired equipment ranged from 1,500 to 2,200 feet. Loading was done by an 80 Northwest 2½-yard shovel that averaged 15,000 yards a week in the rough sidehill cuts.

Rolled Fills

In some of the excavation work the soil was first loosened by a LeTourneau K-30 Rooter before being scooped up by the Carryalls. Fills were placed in 6-inch lifts, spread either by dozers or a pair of Caterpillar No. 12 motor

graders, and compacted by sheepsfoot rollers. Optimum moisture was required during the rolling of the fills, but the material coming out of the ground was usually wet enough without having to be watered by a sprinkling truck.

Equipment was fueled with Texaco products delivered to the job from Knoxville, 45 miles to the west. A 1,000-gallon storage tank was spotted at each end of the job, while refueling in the field was done from a 500-gallon tank mounted on a GMC truck. Lubrication of the various machines was also done in the field from a grease rig, equipped with an Ingersoll-Rand compressor, carried on another GMC truck. The contractor had his field headquarters in a Mack bus fitted out as an office.

Quantities and Personnel

The major items on the 5-mile grading, drainage, and structures contract include the following:

Grading	529,841 cu. yds.
Channel excavation	16,137 cu. yds.
Borrow material	1,033 cu. yds.
Culvert excavation	2,934 cu. yds.
Class A concrete	1,434 cu. yds.
Class B concrete	136 cu. yds.
Reinforcing steel	175,460 lbs.

Nello L. Teer Co. employed an average force of 50 on the road project under the direction of John L. Carrickhoff, Superintendent. They worked a 10-hour day, 6 days a week. Homer Riley is Office Manager on the job.

For the Tennessee Department of Highways and Public Works, J. D. Lillard is Resident Engineer. The project is located in the First Division,

which is supervised by J. B. Ramsey, Division Engineer, and R. L. Iddins, Division Construction Engineer, with headquarters at Knoxville. The Department is headed by E. W. Eggleston, Commissioner. Sam M. Squires is State Highway Engineer, and O. F. Goetz is State Construction Engineer.

Clamp Co. in San Leandro

The Universal Form Clamp Co. of Chicago has purchased three acres at 2051-2059 William St., San Leandro, Calif. Construction of a temporary 20 x 40-foot corrugated-steel building will begin immediately. Preliminary investment will approximate \$50,000, with a total investment of \$200,000 when construction of a 200 x 100-foot concrete building is completed. Development of the property will include the building of a 500-foot drill track from the Southern Pacific spur serving the area. B. R. Hoerr, Pacific Coast Manager, will be in charge of the new plant, which will serve seven western states.



HIT 'EM HARD!
IT TAKES IMPACT TO PUT 'EM DOWN

WARRINGTON-VULCAN
Single-Acting Steam
PILE HAMMERS



Applied power is the key to efficient, economical pile driving . . . power as applied by the Warrington-Vulcan Single-Acting Steam Pile Hammer.

Telling, low velocity blows from a relatively heavy ram give you speed and savings in putting 'em down. You get easy, economical operation through the Warrington-Vulcan's sturdy construction and simple design, with working parts exposed for ready accessibility. You get results through its rapid, regular and continuous action, operating at a medium steam pressure. Costs reach rock bottom, right along with whatever kind of pile you're driving—wood, steel or concrete.

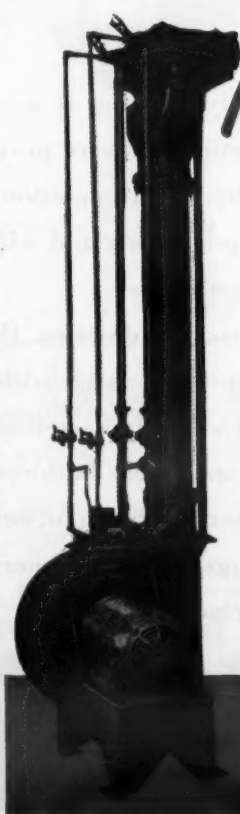
* Write for full information on the Single-Acting Warrington-Vulcan . . . proved on the tough jobs since 1887.

VULCAN IRON WORKS
Since 1882

329 North Bell Avenue

Chicago 12

Illinois



Save Fuel and Increase Production

Your asphalt plant will use less fuel and will give you greater production with Hopkins' low pressure burning equipment.

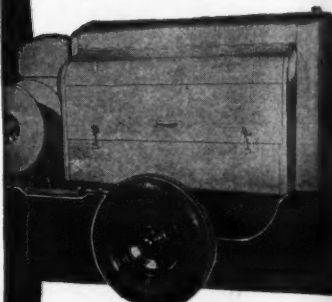
Time after time contractors have found that Hopkins' burners save them money, provide more efficient operation, and increase production. They are adapted to any size or design of dryer.

Hopkins provides the only "package unit" burner system for an asphalt plant. Write for literature.

Oil and Gas
Combination
Burner Unit.

Hopkins' Volcanic Specialties, Inc.
Alliance, Ohio

Bring Compressor Costs Down!



Use the Economical SMITH 105-P Compressor

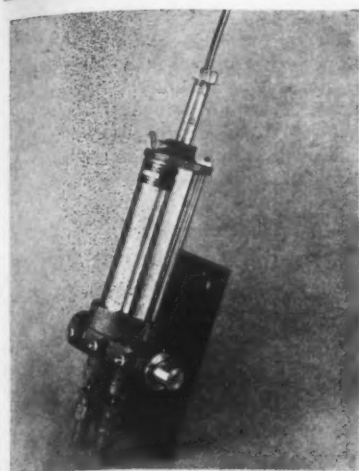
The new Smith 105-P will handle the majority of your compressor jobs, for less. Powered with Chrysler's newest and largest Industrial engine—Ind. 15, six cylinders, 4" bore, 5" stroke, 377 cu. in., 3" crankshaft, 7 main bearings, sodium cooled valves and Stellite valve seats for extra heavy duty and long life. Compressor valves are stainless steel disc type with Manganese Bronze seals. Delivers 105 cubic feet per minute. Equipped with improved type-pilot valve and simplified control for efficient, long life with minimum attention. Write for literature and prices.

Also write for information on
The New SMITH
MODEL 70-P COMPRESSOR

SMITH
Air Compressors

Gordon Smith & Co. Bowling Green, Ky.

483 College Street



The Acme air-entraining-agent dispenser automatically dispenses a given amount of any liquid with the approximate viscosity of water. It is gravity-filled and discharged.

New AEA Dispenser

A new air-entraining-agent dispenser which will automatically dispense a given amount of Darex AEA, or any liquid having the approximate viscosity of water, has been developed by E. W. Zimmerman, 228 N. LaSalle St., Chicago 1, Ill. The Acme dispenser is designed for mounting and automatic functioning on any road paver or stationary mixer. It is filled and discharged by gravity alone and has a capacity of 1 to 30 fluid ounces.

The dispenser consists of a special 2-way valve and a hollow brass cylinder which has a leather cup piston at one end and a vent tube at the other. The piston is calibrated in ounces and may be set at the desired reading by means of a thumb screw. In the fill position, the ports of the 2-way valve are open from the supply line. To activate the supply, the valve is rotated 90 degrees, thereby opening the ports from the dispenser to the discharge line. The manufacturer points out that complete shop prints are available for installation of the Acme dispenser on any particular type or model of paver.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 66.

Jamproof Threader

An improved pipe threader has been announced by The Ridge Tool Co., Elyria, Ohio. According to the manufacturer, the Ridgid 65R self-contained threader is now jamproof. This means that it does not need to be watched while it is threading pipe because a newly designed drive plate automatically kicks out the driving ratchet pawl when a standard-length thread is cut. The lead screw therefore cannot jam on the workholder, the company says.

Also available is a new jamproof drive plate which can be put into present 65R threaders in place of old drive plates. The threader remains otherwise unchanged, threading 1 to 2-inch pipe with one set of high-speed steel dies.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 90.

Self-Priming Centrifugals

A catalog on 2 and 3-inch self-priming centrifugal pumps with capacities of 7,000, 10,000, and 15,000 gph is available from Rice Pump & Machine Co., Milwaukee 15, Wis. These AGC-rated pumps are driven by air-cooled gasoline engines. They are also available with pulleys for belt drives and flexible couplings for direct-connected electric-motor drives.

Features listed in the circular include bellows-type shaft seals entirely enclosed within a cartridge, hardened-steel wearing plates, built-in check valve, large cleanout openings, trash-

type impellers, and direct-line flow of water through the suction opening to the impeller. Capacity ratings under various heads are tabulated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 38.

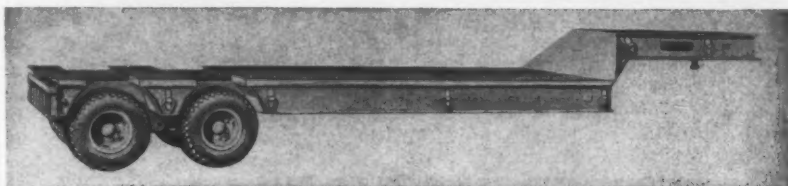
Adjustable Steel Column For Industrial Buildings

A circular describing standard and adjustable steel columns for lightweight industrial and commercial buildings has been prepared by John Shoub & Son, 711 Jacksonia St., Pittsburgh 12, Pa. Perma-Posts are plastic-coated steel columns which are said to be comparable to aluminum in resistance to corrosion. Both the adjustable and non-adjustable posts have a maximum safe load of approximately 20,000 pounds. Specifications and construction features are illustrated in the circular.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 8.

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

Capacities through 75 Ton—Semi and Full Trailers



CARGO CARRIER MODEL GPX (Semi) with Tandem Axles


PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular, forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

TRANSPORT TRAILERS, INC.

TRANSPORTATION ENGINEERING A SPECIALTY
CEDAR RAPIDS, IOWA, U.S.A.

ALL ROPES look ALIKE... but




IN Wickwire Rope

TESTING GOES

100 times beyond normal vision

Uniformity of grain size in steel assures longer life and greater reliability in Wickwire Rope.

Right down the line...starting with the melting and refining of our steel ...and continuing through heat treating processes and cold drawing of the wire, we maintain complete control over the grain size of steel used in Wickwire Rope.

This quality control of basic properties is possible only with a company whose operations are fully integrated from the actual making of the steel to the stranding of the finished rope. It's just one more example of how Wickwire goes "beyond specifications" to give you—at market prices—wire rope that is unsurpassed for reliability, safety and longer life.

See your local Wickwire distributor for the right rope for your particular requirements. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY Preformed.

*For detailed information on the McQuaid-Ehn test and what it means to you in superior rope performance, write to Wire Rope Sales Office, Wickwire Spencer Steel Division of C. F. & I., Palmer, Mass.

WICKWIRE ROPE

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass.

EXECUTIVE OFFICE—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.)•Boston•Buffalo•Chattanooga•Chicago•Denver•Detroit•Emlenton (Pa.)•Philadelphia•Tulsa•Fort Worth•Houston•New York
PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

A Sight-Distance Survey for Conn.

The Record and Statistics Section of the Connecticut State Highway Department is completing the field work necessary for a sight-distance survey of the approximately 3,000 miles of roads in the state system. The survey, part of a program of collecting factual data to be used in planning improvements, will discover the places where sight distances are inadequate for today's traffic. Survey data will be used as a guide for setting code markers to establish passing and nonpassing zones, and for a sufficiency-rating study which will furnish a basis for improvement priorities.

Sight-distance measurements are based on traffic volumes. For example, on two-lane roads where traffic movements total less than 2,000 vehicles a day, sight measurements of 1,500 feet or less are recorded. On two-lane roads which carry 2,000 or more cars a day, sight measurements of 2,600 feet or less



Connecticut Highway Department Photo

A lead car and a follower, both equipped with two-direction radios and odometers, collect field data on highway sight distances in Connecticut.

are recorded.

Two cars equipped with two-direction radios are used to collect the field data. Each car is equipped with a special

odometer on which readings may be taken to 1/100 mile. At every starting point the odometers are synchronized. The lead car has a target in the form of a white light attached to its rear bumper upon which the operator of the following car sights. In operation, both cars travel as close as possible to the center line of the road.

A survey at a particular point is begun with the lead car moving away from the stationary second car until it begins to disappear from view. The operator of the second car then halts the lead car by radio and both operators take odometer readings. The sight distance is the difference of the two readings.

As a safety measure, flashing lights are mounted on top of each vehicle and warning signs are attached front and rear to warn traffic of sudden stops.

It is not considered necessary that a road permit vehicle-passing opportunities throughout its entire length. It is desirable, however, that several such opportunities be provided within each mile. This sight-distance survey will establish the number of possible passing zones on each road in the system.

Harvester Company Builds

International Harvester has begun construction of a new building between 13th and 17th Avenues in Broadview, a suburb of Chicago. The building, which will house a service parts depot and a machine transfer, will contain more than 1,100,000 square feet of floor

space.

The parts depot is the ninth of Harvester's proposed network of twelve. It will serve as a wholesale parts distribution center for company-owned district sales offices, branches, and retail dealers in Illinois, Indiana, western Michigan, southern Wisconsin, eastern Iowa, and northern Kentucky.

Plywood and Lumber Buying

An 18-page catalog titled "A New Dimension in Plywood and Lumber Buying" has been prepared by the Georgia-Pacific Plywood & Lumber Co., Augusta, Ga. It covers the planned buying system offered by the company, savings in the storage and handling of lumber, guarantees for top quality in every grade, and the value of Georgia-Pacific consultants. The booklet lists the company's products and identifies its sales offices, plants, and warehouses.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 103.

Lower Hose Replacement Costs on Jobs Like This!



"SUBWAY" "Standard of Quality" AIR HOSE

Because "SUBWAY" is made to stay on the job longer, under conditions that give air hose the roughest kind of treatment, replacement costs for this important item are kept to an absolute minimum.

The balanced construction of this hose assures equally long life for tube, carcass and cover—no wearing-out of one part to cause hose to be scrapped while remainder is still good.

Extra protection is given to the strong, durable duck carcass by a tough, red rubber cover that fights severest abrasive wear and rough handling with real championship endurance.

Despite its superior strength and stamina, "SUBWAY" is flexible, light in weight and easy to handle. In wrapped duck construction, sizes 1/2" to 1 1/4", maximum lengths of 50 feet.

Prompt Delivery to Your Job from a Nearby GOODALL Branch



GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • Detroit • St. Paul • Los Angeles • San Francisco • Seattle • Portland • Salt Lake City • Denver • Houston • Distributors in Other Principal Cities

Est. 1870

THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS CONCRETE FASTER

TAMPS BACKFILL BETTER AND FASTER FOR LESS



THE NEW, MORE POWERFUL MIGHTY "B" MIDGET

Fastest Pneumatic Concrete Breaker and Backfill Tamper. Replaces all the dirt removed after pipe has been laid. Gives you high density compaction. Ready to repave immediately. No temporary paving. No spoiled dirt to haul away. Due to high density compaction, requires little asphalt in replacement. Cuts cost of tamping and breaking of concrete many times. Can be worked manually or automatically. 160' Compressor for full capacity, or 105' Compressor for 1/2 capacity. For further particulars, see your nearest dealer or write R.P.B. Corporation.

Write for Complete Information to Dept. C

R. P. B. CORPORATION

2751 East 11th Street Los Angeles 23, California

for low-cost pumping



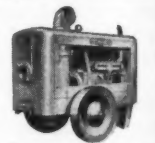
JAEGER invites 5-way comparison with any other pump

- 1: Priming speed
- 2: Vacuum, capacity and pressure
- 3: Gallons water moved per gallon of fuel
- 4: Self-cleaning ability
- 5: Hours of service per dollar invested

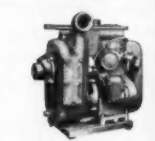
Latest type 2" and 3" heavy duty units with weather-shielded engines.



4" to 10" Portables: Specially housed for easy access to engines, larger fuel tanks.



Aluminum Pumps: with replaceable liners, stainless steel shell fitting. 1 1/2", 60 lbs., up to 5700 gph.—2", 105 lbs., 9000 gph.



Jetting Pumps: For pressures to 275 lbs. Also 2" to 8" pressure pumps for supply work. Diaphragm pumps for sand and mud.



Ask for Complete Pump Catalog

THE JAEGER MACHINE CO.

Columbus 16, Ohio

Distributors in 130 Cities of U. S., Canada

AIR COMPRESSORS • MIXERS
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BITUMINOUS PAVERS
CONCRETE SPREADERS • FINISHERS

Portrait in Print

By RAY DAY

Houstonian Is Leader, Builder, In Every Sense of Those Words

WARREN BELLOWS regards construction and civic work as just a couple of things a man should do well—with-out talking too much about them. Houstonians tell how he directed the first fund-raising campaign to start the Texas Medical Center. For three months he gave it everything he had, practically day and night. Chamber of Commerce associates tell how he addressed as many as four or five groups in one day, and still found time to visit his construction jobs in between. But Bellows himself plays it down. "I'm not an orator or a prophet," he says, with a half-serious expression on his ruddy face.

Among architects and contractors alike, The W. S. Bellows Construction Corp. is respected as one of the building leaders in the southwest.

Bellows is a big man, both physically and mentally. He is the type of man who would naturally be associated by people with the development of Houston and Texas. Although he is a careful bidder, he confesses an admiration for oilmen who gamble hundreds of thousands of dollars on a hole in the ground.

Leadership: Responsibility

In one of his annual messages as Chamber of Commerce President, Bellows remarked that Houston's greatest asset was leadership: the quality, ability and enthusiasm of those who measure up to their responsibilities. Bellows is a firm believer in that asset in a business or a community or a government.

Not enough young men are being fitted to become good leaders, Bellows believes, and when he finds a young man who shows promise along that line he will follow his career with all the interest a father would show in his own son. Bellows has three sons—Warren, Frank, and George. To get them started right, he insisted on their going to work from the field up. All three served tough apprenticeships and hold union cards in various trades today. Bellows says there isn't much chance for a man to go to the top and do the right kind of a job unless he can handle it at the bottom too.

Take building research, for example. In the building field today there is a need for better construction at lower cost, and Bellows is interested in any move in the right direction that will point to that result.

Bellows is so interested in whatever he does, in fact, that he hasn't much time for hobbies. On his desk is a motto to the effect that a man ought to like what he's doing—or not do it.

Raised in Midwest

Bellows was born in Kansas City, Missouri, on August 15, 1889. His father was a well known doctor, Dr. George E. Bellows. He is a graduate in civil engineering of the University of Kansas. In 1947 his alma mater honored his contribution to the engineering profession by presenting him its award for Distinguished Service.

His first job in the construction industry was as a timekeeper on a track-laying job for the Union Pacific Railroad in Kansas when he was 16. A year later he was running a transit on the Los Angeles Aqueduct across the Mojave Desert.

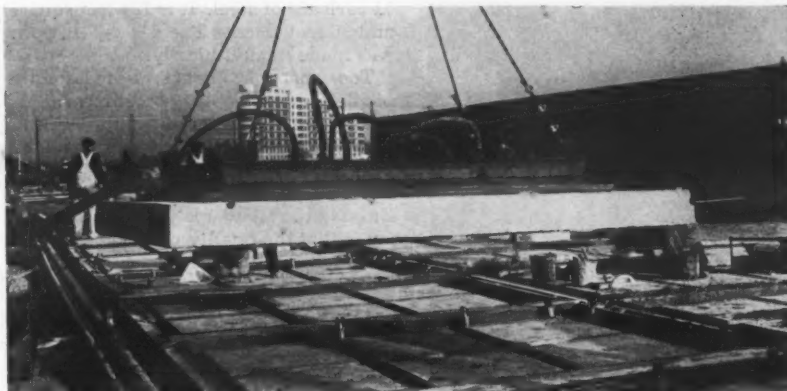
Mixed up practically all the time with any of a dozen big programs, Bellows' tastes are essentially simple. He will sometimes walk off one of his jobs and, with mud still on his shoes, go to see

Jesse Jones, former head of RFC and a good friend. He likes nothing better than to get a group of friends together for a fishing or hunting trip—but he enjoys their fellowship more than the mere killing of game.

A Long Career

Bellows determined early to be a contractor and has followed it since he took summer jobs in high school, through his college training and jobs. After graduation he spent six years in Canada building grain elevators. In the 35 years he has built skylines, his

(Continued on next page)



The Vacuum Concrete Lifter removes slabs when only twelve hours old.

Vacuum Concrete Precasting Doubles Speed of Construction. Write for information and literature.

Vacuum Concrete, Inc., 4210 Sansom Street, Philadelphia 4, Penna.

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Proved on many of the nation's biggest jobs!

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BITUMINOUS FIBRE EXPANSION JOINT FILLER

The top performance and durability of Flexcell have been proved in hundreds of major installations from coast to coast... including the San Francisco-Oakland Bay Bridge, Pennsylvania Turnpike Superhighway, Chicago Municipal Airport, and Knickerbocker Village, N. Y.

That's why more and more engineers and architects are specifying this superior bituminous fibre expansion joint filler for pavements, sidewalks, curbs, gutters, driveways, etc., on projects of all types!

Flexcell Bituminous Fibre Expansion Joint Filler is regularly specified by a majority of State Highway Departments. The U. S. Army, Navy and other Government agencies are large users for cantonments, munition plants, housing and other projects. Write today for complete specifications and prices! No obligation. The Celotex Corporation, 120 South La Salle Street, Chicago 3, Illinois.

Flexcell is the only expansion joint filler offering all these advantages

1 NON-EXTRUDING. Millions of tiny air cells permit compression without displacement. Will not extrude under pressure by adjacent concrete slabs.

2 RESILIENT. Re-expands on release of compression, preventing open joint crevices. Flexcell's "recovery" under severe laboratory tests is over 70%.

3 COMPRESSIBLE. Compresses uniformly. No hard cross-grain, knots, or other defects. Provides 50% compression under loads up to 750 lbs. per square inch.

4 DURABLE. Proved by years of actual use in major installations all over the nation. Withstands severest service, extremes of heat and cold. Protected against termite and fungus attack by the exclusive patented Ferox® Process.

5 ADHERES FIRMLY. Its rough-textured surface grips and holds concrete more firmly. Keeps joints closed.

6 STAYS PUT. No possibility of any piece, splinter, or strip working loose and protruding above surface of slab, thus impeding or endangering passing traffic.

7 MOISTURE RESISTANT. Each of the long, tough

Louisiana cane fibres in Flexcell is coated with a durable moisture-proofing compound by the exclusive Flexcell Process.

8 EASY WORKABILITY. Lightweight, easily cut with hand saw, readily stored, holds its shape indefinitely. Provides neat, finished joint with no trimming.

9 ALWAYS UNIFORM. Precise scientific control during manufacture assures uniformly high quality and dependability.

10 VERSATILE. Outstanding for work requiring special cutting, tapering, and fabricating. Unsurpassed for concrete work above grade, around bridges, grade separations, overpasses, and concrete building construction. Replaces products of much greater cost.

11 ECONOMICAL. Measured in terms of performance and service, Flexcell is indisputably the most economical product of its type on the market.

12 QUICKLY AVAILABLE. Flexcell distributors conveniently located from coast to coast are kept supplied with ample stocks at all times. These distributors are equipped to handle all requirements, special sizes, cutting, punching—promptly, without delay!

SPECIFICATION APPROVALS

Flexcell® Bituminous Fibre Expansion Joint Filler meets the requirements of: American Association of State Highway Officials Standard Specification M 59-42. Federal Specification HH-F-334. American Society for Testing Materials Tentative Revisions of Standard Specifications for Preformed Expansion Joint Filler D 544-48.

FLEXCELL

BITUMINOUS FIBRE EXPANSION JOINT FILLER
The Celotex Corporation, Chicago 3, Illinois



Here is a recent portrait of Warren S. Bellows, a building and civic leader in the southwest.

Bellows Is Leader, Builder in Houston

(Continued from preceding page)

firm has handled well over \$200,000,000 worth of work. He came to Houston in 1923 and his first building job was the Auditorium Hotel. When he built the Criminal Courts Building and two hotels in Galveston.

His record of buildings began to mount, and by the late 1930's Bellows was recognized as one of the outstanding building contractors in the south. His firm was the successful bidder on the San Jacinto Memorial, which was built in 1936-39 in connection with the Texas Centennial observance.

The glistening shaft dedicated to the heroes of Texas stands on the famous battlefield of San Jacinto, 22 miles from Houston. There in 1836 General Sam Houston and his band of some 800 tattered patriots put to rout Santa Anna's Mexican army of twice the strength, lifting from Texas the yoke of Mexican oppression, assuring the complete independence of the Lone Star State, and securing for the United States nearly one-third of its land area.

The 570-foot memorial is constructed of reinforced concrete faced with variegated golden-buff Texas limestone quarried near Austin. Polished limestone is of shell formation and resembles travertine marble because of its glossy surface.

Bellows remembers that it was a tough job. The foundation was one of the biggest pours he ever handled. It was built to last through the centuries. In it are 120 carloads of gravel, 90 carloads of sand, 25 carloads of cement, and

11 carloads of steel. It is 124 feet square and 36 feet thick. The 6,000-yard pour was made monolithically.

Too many contractors today are bidding too cheaply, sometimes at or below cost, he believes. They are not going into the details carefully enough. The by-product of this will be, of course, that some firms will go broke. But what is far worse in Bellows' opinion is that the quality of work is certain to suffer—and that is bad for the contractor, for the architect, and for the man who pays for the building.

Bellows doesn't bid that way because it's fashionable right now. He still considers every angle, and by the time his bid is ready, Bellows has a fair idea of exactly how he'll handle each portion of the building.

Bellows demands that same decisiveness from his subordinates. "When he asks you something," one employee explained, "he wants a straight-forward answer. He doesn't like flattery and he doesn't like yes-men. If you don't know the answer, it's best to tell him."



J. H. Russell of the Houston Chamber of Commerce (left) presents W. S. Bellows with a fine shotgun in appreciation of the job he did as President of the C. of C.

He checks each job each day insofar as possible. He is tremendously interested in people, and Houston Chamber

of Commerce clerks never got over the many visits they had with the big soft. (Concluded on next page)

Automotive Shovel With Hydraulic Crowd and Hoist Speeds Up Excavation Work

Unit Reduces Excavation Costs; Loads Up To One Cubic Yard A Minute

MOVING SHOVEL LOADERS to and from jobs is one of the most expensive unproductive costs in excavation work. Contractors lose hundreds of hours and spend thousands of dollars annually moving this equipment. Developments since the war show that contractors can be relieved greatly of these costs. One of the most successful developments has been the manufacture of the rubber-tired Dempster-Diggster shovel loader that travels at truck speeds.

Digs Through 15 Foot Bank

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowding reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Manufacturer's tests and contractor's reports show that the Diggster will load up to one cubic yard a minute. This speed in excavation is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the



ENCLOSED STEEL CAB protects operator against inclement weather.



THE DEMPSTER-DIGGSTER is shown here digging out a 15 foot bank of hard chert. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels.

Diggster, of course, can move at the fastest possible speed.

Not A Fair Weather Machine Only

Under adverse conditions on a state highway near Charleston, W. Va., recently, the Diggster loaded 150 cubic yards of sticky blue clay in only three hours. The work consisted of cleaning up slides on 14 foot embankments on both sides of a concrete road. The weather was not cooperative, inasmuch as considerable rain fell the night before. But the Diggster showed no tendency to slide. The job foreman stated that it loaded more material in two hours than the $\frac{3}{4}$ and $\frac{1}{2}$ cubic yard truck shovels normally did in an entire day. This and many other operations in inclement weather have proved that the Diggster is not a fair weather machine only.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and $1\frac{1}{4}$ cubic yard (heaped) capacities. Materials handling buckets in $1\frac{1}{2}$ and 2 cubic yard (struck) capacities.

Crawler Traction Available

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.



Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc., Knoxville, Tenn.



DEMPSTER BROTHERS
4100 Shea Bldg.
Knoxville 17, Tenn.

KEEP INFORMED—

For further information and literature on products described in this issue, turn to page 16 for the Red Request Card. Our Reader Service Department will be glad to help you.

Contractors and Engineers Monthly

470 Fourth Ave.
NEW YORK 16, N. Y.



Perlate Studios Photo

This glistening shaft of concrete faced with limestone stands on the San Jacinto battlefield 22 miles from Houston. Bellows remembers its building as a tough job. The foundation was one of the biggest pours he ever handled.

talking Texas contractor. In the same way, he knows all his men. In the case of key men, he knows their problems and he has a genuine interest in their hopes, their ambitions, and their defeats. He gives generously, from his rich experience with life, counsel to those who seek it. It is one of the secrets of his own ability to be a leader.

The Associated General Contractors of America recognized these qualities, and in 1946 the organization made Bellows President. It was one of the most crucial years of the AGC's existence, because of the transition from war to peace, but Bellows led the organization through to a solution of many of its problems.

Business, government, and individuals today need a new dose of fundamentals, Bellows believes. Without calling any faults by name he deplores opportunism in any form. The only sound foundation under a man or a business is what will be best for that man or business in the long run, considering the welfare of organized society as a whole. To measure up to Bellows' standards a contractor or an individual has got to produce something that will benefit the country in the long run.

Perhaps that is the key to Bellows' cosmopolitan list of accomplishments, civic as well as business. He has left his mark in many places in the growth of Houston, and it is hard to say where they begin or end.

Looking at the buildings, it seems that Bellows is a builder of skylines. Looking at the new Texas Medical Center taking shape, considering his affiliation with such diverse organizations as the Gulf, Colorado & Santa Fe Railroad, the ASCE, the Houston Engineers Club, the Texas Prison System Board, Y.M.C.A., First Presbyterian Church, and many others too numerous to mention, it seems that Warren Bellows is a builder in every sense of the word.

Safety Contests

A packaged plan for safety contests—prizes to be paid by the National Safety Council—is included in the Council's 1951 calendar contest kit. Each monthly sheet of the calendar has a color painting and a limerick to be completed by contestants. The contest rules are printed on the backs of the sheets. The kit contains a complete instruction booklet, monthly contest posters, streamers and contest bulletins for bulletin boards, reproduction proofs and mats of limerick contest cartoons, sample entry forms, and copy for letters and announcements.

The Council offers cash prizes each month of \$100, \$50, and \$25, and thirty prizes of \$5 for the best last line of the current limerick.

The kit is free with orders for 200

or more calendars, or with smaller quantity orders if the order provides a calendar for each employee. Order from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Maryland Press and Radio Inspect Highway Projects

Editors of Maryland's weekly newspapers and radio news commentators have been getting a first-hand impression of the state's highway improvement program to pass on to their readers and listeners. During August and September, the Maryland State Roads Commission sponsored seven one-day tours to cover highway projects.

Each tour averaged about 200 miles, the itinerary being divided into two sections, a morning and afternoon trip, so that editors and radiomen could conserve their time by selecting the portion in which they were most interested. The tour groups inspected completed projects, work in progress, and sites of future projects.

ROGERS

HIGH CAPACITY EQUIPMENT
FOR LOW COST ROCK REDUCTION

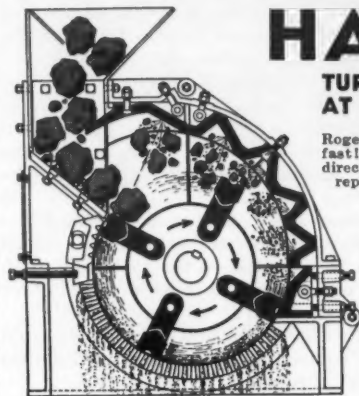
Double
Shattering

HAMMERMILL

URNS OUT AGRICULTURAL LIME
AT 1600 R.P.M. WITHOUT A GRATE

Rogers "Double Shattering" Hammermills turn out ag-lime fast! Hammers throw rock against fixed breaker plates at a direct 90° angle, giving maximum shattering impact. Easily replaced breaker sections and hammers keep maintenance costs down. Rogers Hammermill produces high quality road rock at speeds of 800 to 1200 R.P.M. For better rock products and lowered production costs use Rogers equipment.

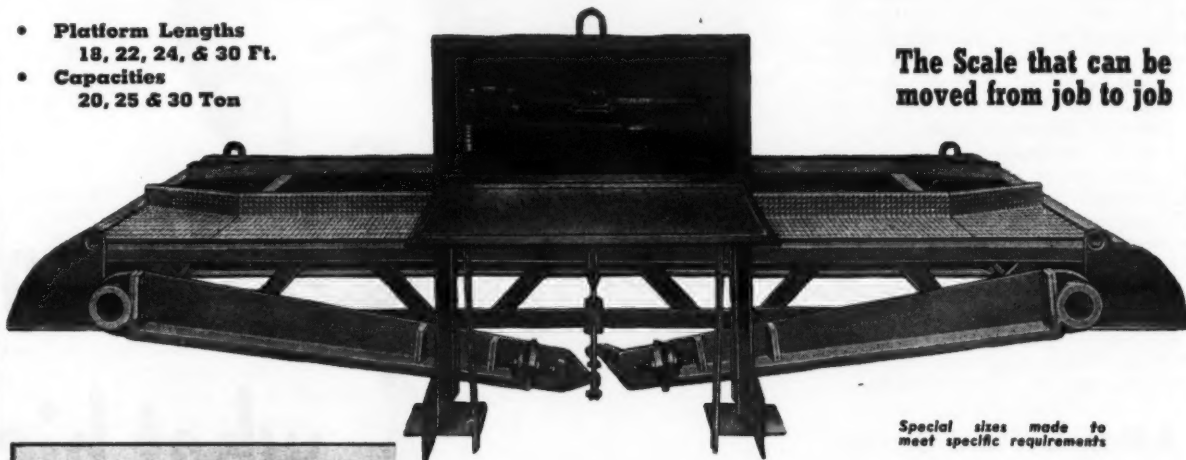
Write for
free booklet
on Rogers
Hammermills



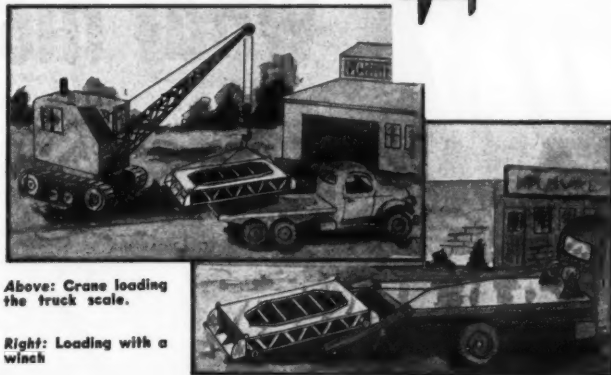
THURMAN PORTABLE TRUCK SCALE

- Platform Lengths
18, 22, 24, & 30 Ft.
- Capacities
20, 25 & 30 Ton

The Scale that can be
moved from job to job



Special sizes made to
meet specific requirements



Above: Crane loading
the truck scale.

Right: Loading with a
winch

Accurate and Portable—This scale can be moved from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Scale can then be moved and readied for use in minutes.

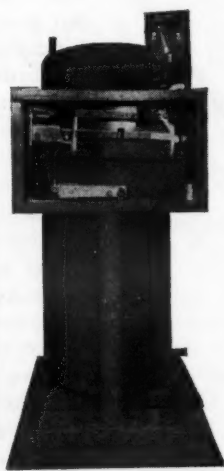
Wide Steel Bases—support scale—require no concrete footings. Easy-to-read baked enamel weighbeam with vital parts electroplated against corrosion.

IMMEDIATE SHIPMENT AVAILABLE

WATER SCALE

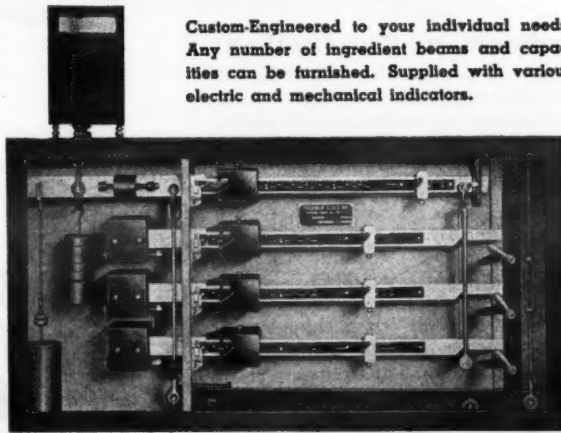
Designed to weigh all types of liquids. Engineered to meet your specifications. Calibrated in pounds and gallons. Supplied with sensitive electrical and mechanical indicators.

Information available on
Thurman Wheelbarrow Scales,
warehouse, utility and pit
scales. Write today.



BATCHER SCALE

Custom-Engineered to your individual needs. Any number of ingredient beams and capacities can be furnished. Supplied with various electric and mechanical indicators.

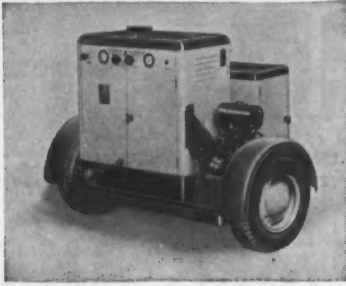


THE THURMAN MACHINE CO.—Scale Division

156 North Fifth Street

Established 1918

Columbus 15, Ohio



On-the-job steam cleaning is possible with the new 120 and 150-gallon-capacity Kerrick steam cleaners.

New Steam Cleaners Can Work on the Job

A new gasoline-engine-powered steam cleaner, designed for on-the-job uses where water, gas, or electric connections are not available, has been announced by the Clayton Mfg. Co., P. O. Box 550, El Monte, Calif. Two models are being built: the Model A, with a 120-gallon capacity, and the Model AR, which combines in one unit a steam cleaner of 150-gallon capacity and a high-pressure rinse unit of 275 gallons per hour. Both models are available in stationary, portable, or trailer types.

All units are oil-fired and equipped with a 2-hp gasoline engine. On the trailer types, a 75-gallon water tank may be substituted for the toolbox. Performance is said to be comparable in every way to the 10 standard electric oil and gas-fired Kerrick machines manufactured by Clayton, which have a thermal efficiency in excess of 75 per cent. Volume and pressure from the rinse unit on the Model AR is said to be ample for rinsing and knocking off mud and heavy encrustations prior to steam cleaning. Rinse water can be used either hot or cold. The trailer machines are designed for field operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 99.

A New Ground Clamp

A new lightweight ground clamp of 300-amp capacity, the GC-3, has been developed by The Lincoln Electric Co., Cleveland 1, Ohio.

The GC-3 is designed to provide a convenient, readily movable, yet solid ground connection for welding jobs where currents do not average over 300 amperes. It is said to cut accessory costs for these jobs and eliminate handling heavy-duty clamps on jobs where their extra capacity is not needed. The clamp weighs 1½ pounds and has a jaw spread of 2½ inches. A heavy direct-acting spring provides connection with the work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 22.

Underground Rock Loading

A new 18-page catalog describing and illustrating the Whaley Automat shoveling machine for underground loading operations has been prepared by Myers-Whaley Co., Inc., P. O. Box 789, Knoxville 1, Tenn. The Automat is designed to deliver 7 tons per minute maximum and 3 tons per minute average. It has an automatic shovel and the necessary mechanism to operate the shovel, dispose of the material shoveled, and move from place to place. It is composed of three major sections: the swinging jib, the main frame, and the rear conveyor section. Each of the units is completely described and illustrated with cross-section engineering drawings. Specifications, an outline of the mechanical features, and all necessary data are included in Catalog No. 250.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 109.

Rock Rakes and Stumpers For Land-Clearing Work

Surface clearing operations in forested or rugged terrain can be simplified by using Fleco stumpers and rock rakes, according to two new bulletins prepared by Florida Land Clearing Equipment Co., 1561 W. Church St., Jacksonville 3, Fla. The new bulletins illustrate Fleco tractor-mounted equipment performing a variety of work in clearing highways, power-line right-of-ways, etc.

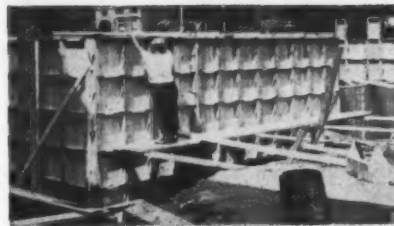
The literature points out that Fleco rakes are interchangeable and can be mounted on any bulldozer arrangement where the moldboard is detachable from the pusharms or C-frame. A quick-change feature is illustrated with job photos. Also illustrated is the Fleco root-rake shoe, and attachments which can be mounted on the root-rake tooth for operations where willows and other small underbrush are encountered.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 105.

SYMONS FORMS · SHORES · COLUMN CLAMPS

Doing a Good Job -

AN EASY WAY



FORMS—Cut labor costs 50%. Only three pieces of hardware—bolt, wedge, form tie. Tie remains in the concrete, bolt and wedge may be reused. Bolt holds the forms together and holds the ties both ways. No nails or spreaders. To strip forms take out wedges, remove bolts, then pull forms up or out. Ties break back inside the wall 1" from the surface. Made up ready for use or you may purchase the hardware for building your own forms.

SAFETY SHORE—Lighter, stronger, easier to adjust and safer to use. Symons Shore has these exclusive features...

metal scab, powerful lifting jack, simple and secure bar head and an extension for very high ceilings. Compare the Symons Shore with other shores and you will be convinced of its superiority. **COLUMN CLAMP**—Has only two units—both alike. There are no loose parts. Simple to put on—only tool required is a hammer. Symons Clamp is the only clamp known that will positively square up the column. Completely adjustable.

Symons Forms, Safety Shores and Column Clamps can be rented with purchase option. Write today for your Catalog on Symons Forms, Safety Shores, Column Clamps and Accessories.

SYMONS CLAMP & MFG. CO.

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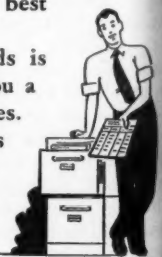


This man knows what his wire rope costs him

He's quit guessing. Now he knows what his wire rope *actually* costs. He learned long ago that purchase price alone doesn't tell him a thing. So he devised a simple system of records—records that show the amount of work his ropes do, and their cost per unit of work.

This is something that Bethlehem has always recommended. To get a true picture of rope costs—an accurate picture—you should have figures showing the cost per ton-mile, yard of rock moved, or other unit that best applies to your business.

The keeping of such records is good, sound practice. Gives you a chance to compare rope values. That we like—for we're always ready to stack the Bethlehem product against all comers. You'll be, too—when you use this rope consistently.



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TELL YOU!

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Canal Is Dredged At Chain of Rocks

Retaining Dikes Built for Levees Along the Banks of 8.4- Mile Canal By-Passing the Mississippi River

A NEW canal is being dredged through Illinois bottom lands along the left bank of the Mississippi River as part of the Chain of Rocks improvement. The man-made channel will bypass the rocky, shallow reach in the river that has long been hazardous to navigation. This project of the Corps of Engineers, U. S. Army, St. Louis District, has been under way since 1948. The locks at the lower end of the canal, being built by the River Construction Corp., are scheduled for completion late this year. (See C. & E. M., February, 1949, pg. 23.) They consist of a main lock 1,200 feet long x 110 feet wide, and an auxiliary lock 600 feet long x 110 feet wide. They are located about due west of Granite City, Ill.

The upstream end of the canal leaves the present channel of the Mississippi River at a point about 1 mile below the mouth of the Missouri River. The downstream end enters the river channel again about 3,800 feet upstream of Merchants Bridge opposite St. Louis. Its total length will be 8.4 miles, involving some 23,000,000 cubic yards of excavation. The Corps of Engineers awarded a contract for the construction to the McWilliams Dredging Co. of New Orleans, La., on its low bid of \$7,369,753.50. Work on the canal got under way in July, 1949, and is expected to be finished in August, 1951.

Before the canal project started, a new bridge to carry U. S. 66 across the canal site was first constructed. This structure is located between Mitchell, Ill., and the Chain of Rocks Bridge spanning the Mississippi. Various pipelines and utilities crossing the canal site were either removed or relocated to permit excavation of the canal to the desired depth.

Navigation Canal

The canal has a bottom width of 300 feet, with 1 on 3 side slopes to a top width of approximately 550 feet. The

depth of cut will vary from 15 to 45 feet, with an average depth of around 35 feet. Dirt removed from the big ditch is used to construct about 14.5 miles of levees along both sides of the canal. The levee work includes preparing foundation, placing embankments, placing 1,450,000 cubic yards of topsoil and dressing, and seeding and mulching 900 acres of levee surface.

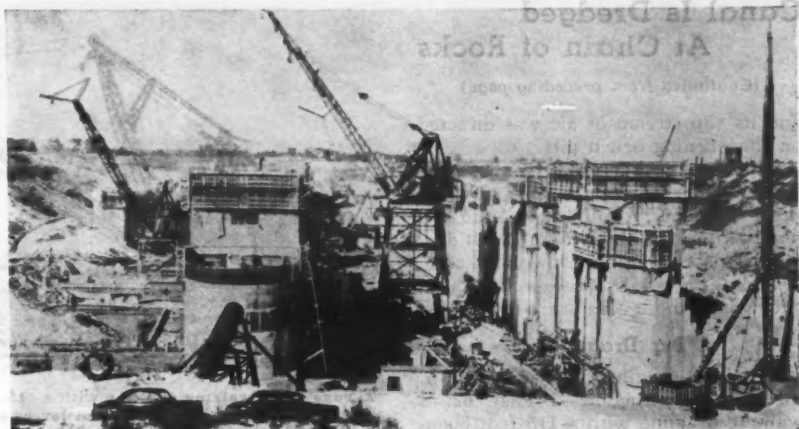
On top of the levees, crushed-stone or gravel roads will be laid. The contract also includes relocation of about 2,800 linear feet of the St. Louis-Alton Road, and necessary bank protection at the upstream end of the canal.

For the mile immediately north of the locks, the canal has a bottom width of 700 feet. On a typical section with a 300-foot bottom width, the canal has a bottom elevation of 378 mean sea level. Natural ground averages around 412 to 414 elevation. Levees are built on each side of the canal to elevation 439.5 as protection against floods. They have a 20-foot crown and 1 on 5 side slopes. The center line of each levee is 527½ feet from the center line of the canal. The toes of these levees on the canal side are about 150 feet from the edge of the cut to prevent displacement due to the weight of the levees. Berms extending out from the levee toward the edge of the canal are built up to elevation 421.

Land Work

Before the McWilliams Dredging Co. could begin dredging the canal, the site was first cleared, topsoil was stripped from the area, and retaining dikes were built within which hydraulic material was later pumped to form the great levees. All the earth-moving operations on land were done by Eugene Luhr & Co. of Columbia, Ill.

Trees up to 3 and 4 feet in diameter were blasted out of the ground with Atlas 40 per cent dynamite, and snaked off the right-of-way with tractors. Four D8's were part of the equipment. Topsoil was stripped from the canal site to a depth of 2½ feet and stockpiled in the form of retaining dikes for the levees. These dikes were built up to elevation 428, or 14 to 16 feet above



C. & E. M. Photo

Here are the locks of the Chain of Rocks improvement—the main one at the right and the smaller one at the left. An American Revolver crane is in the foreground.

natural ground.

To speed up the burning of the many piles of brush that were collected over the area, the contractor used a forced

draft to keep the fire blazing. A 4-blade propeller powered by a GMC gas engine was set up at the rear of a dump truck, (Concluded on next page)

How to DOUBLE EFFICIENCY of your snow removal equipment



Last winter's big snows proved beyond doubt that La Crosse trailers can practically double the efficiency and working range of slow-moving snow plows, dozers, loaders, etc. By purchasing extra trailers now, you can move your big equipment where it's needed FASTER... get it working QUICKER... on to other jobs WITHOUT COSTLY DELAYS. Moreover, you keep your investment low... have extra trailers for year-'round utility.

You'll find heavy-duty La Crosse low boys especially well fitted for winter hauling because they trail easier on slippery roads... are easier to load and unload... have extra-capacity, flat-platform gooseneck for carrying spare tires, sand, cinders, etc. Choice of single, dual or tandem axle design from 6 to 67 tons capacity—standard or custom-built. May we discuss your requirements... now?

LC-9



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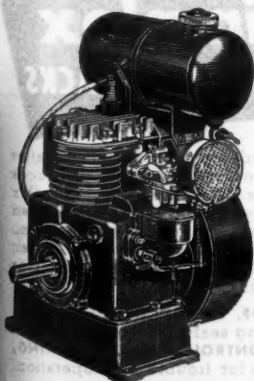
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Compact • Quick-Starting
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Kohler Engines are designed, engineered and built to give the same dependable, economical service that has won worldwide acceptance for Kohler Electric Plants in construction and other industries. Made in several sizes, they are suited to a wide range of uses. Kohler engineers will gladly assist in working out applications for your particular requirements. Write for information. Dept. 6-X, Kohler Co., Kohler, Wisconsin. Established 1873.

Model K7-1, 1½ H.P., 4-cycle, single cylinder, air-cooled. Length 13", width 14", height 17", Weight 38 lbs.

POWER FOR:

- Concrete Mixers
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PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS • AIR-COOLED ENGINES

Canal Is Dredged At Chain of Rocks

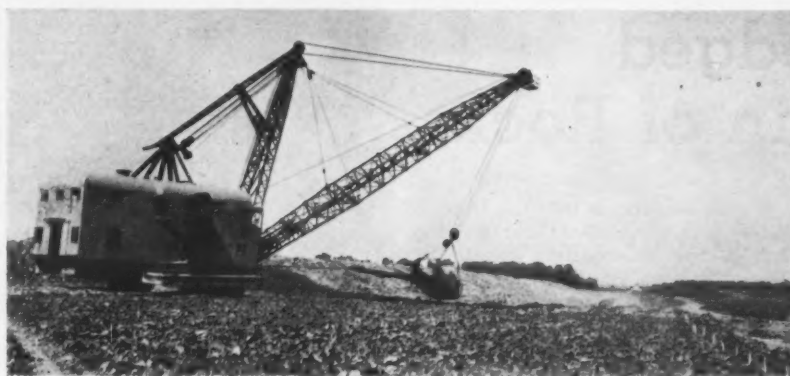
(Continued from preceding page)

and its slip stream of air was directed on the burning brush pile.

Since the topsoil used in the dike building was to be used later to cover the levee slopes, it could not be the sole material forming the dikes. Additional dirt was borrowed from the canal area, or from the strip between the dikes over which the levees are built up.

Big Draglines

Three big draglines were engaged in the dike construction—a Page 621-S walking dragline with a 115-foot boom and a Page 10-yard bucket; a Bucyrus-Monaghan 5-W walking dragline with a 100-foot boom and a Hendrix 8-yard bucket; and a 4500 Manitowoc Speed-crane on crawlers, with a 100-foot boom and a Hendrix 6-yard bucket. In addition, dirt for the dikes and topsoil was moved by two Euclid twin-engine



C. & E. M. Photo

A Page 621-S walking dragline with a 115-foot boom and a Page 10-yard bucket builds retaining dikes for levees along the new 8.4-mile canal.

18-yard scrapers, one engine mounted conventionally in front, and the other engine at the rear. The Caterpillar D8 tractors with dozer blades also moved materials on short hauls, or worked with the scrapers while loading. They dressed the slopes along with a Caterpillar No. 12 motor grader.

Last October the big 30-inch hydraulic dredge G. A. McWilliams arrived on the project and began work at the north end of the canal. It dug into the left bank of the river, cutting the canal out southward. The dredged material, mostly sandy in nature, was pumped between the dikes to form the levees. Excess material from the canal was wasted in spoil areas. In a few locations there was insufficient material from that particular section of canal to form the required height of levee. Excess dirt from other locations was then moved lengthwise along the project to these low places. With the hydraulic method of placing fill, 5 per cent more material was added to take care of shrinkage.

When the levees are completed their slopes will be covered with the topsoil, seeded, and mulched. A 14-foot gravel road will be built on the 20-foot levee crown. The surfacing aggregate will have a depth of 6 inches, and will be laid in two layers. Each lift will be compacted by the loaded hauling equipment.

Quantities and Personnel

The major items in the canal contract include the following:

Canal excavation	23,300,000 cu. yds.
Placing topsoil	1,450,000 cu. yds.
Levee-road surfacing	135,000 sq. yds.
Seeding and mulching	900 acres

For the McWilliams Dredging Co.,

L. R. Thornton is Superintendent and G. J. Schmidt is Engineer. Eugene Luhr & Co. was represented on the project by Alois Luhr, serving as Superintendent.

For the Corps of Engineers, L. F. Trost is Resident Engineer. The St. Louis District is headed by Col. B. C. Snow, District Engineer. The Chain of Rocks improvement is under the general supervision of Brig. Gen. D. G. Shingler, Division Engineer.

A New Drill Press

A new economy model 14-inch drill press, in both bench and floor models, has been announced by South Bend Lathe Works, South Bend 22, Ind. Its construction is simplified and it offers several new features.

General specifications are: capacity to drill to center of a 14¼-inch circle, a maximum drill size of ½ inch in steel, spindle runout 0.005 inch, spindle square to table within 0.0075 inch in 5 inches. Table surfaces and the base surface of the bench model are precision-ground and slotted. The table also has a ¾-inch-thick edge rib all around for clamping the work. A vertically mounted ⅓ or ½-hp 1,725-rpm motor may be used to power these drill presses; it will give the operator a choice of four spindle speeds ranging from 740 to 4,070 rpm. Additional speeds from 380 to 7,770 can be obtained.

Various accessories such as a table vise, fully enclosed belt guards, straight-shank spindle, bench, multispeed attachment, balanced pulleys, a mortising attachment, work light, motor wiring kits, etc., are available. The headstock

casting is drilled and tapped where necessary so that the light, wiring, and switches can be installed.

Further information on this new drill press may be secured from the company. Or use the Request Card at page 16. Circle No. 1.

New Dry Lubricant For High Pressures

A new dry lubricant and anti-seizing compound, Molykote, has been developed by The Alpha Corp., Greenwich, Conn. This product is said to have high film strength, low coefficient of friction at extreme bearing pressures, tenacious adherence, and high chemical and thermal stability. Molykote has the capacity, says Alpha, to prevent galling and seizing at bearing pressures of over 100,000 psi and at either high or low sliding velocity.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 113.

SUMMER

rains have shortened your asphalt paving season...

THIS FALL

catch up on lost working days

with

DARAKOTE

anti-stripping additive

Don't let the end of September mean the end of your asphalt season. Use **DARAKOTE**, and you can continue cold-patch and repair work far into the Fall... despite cold, wet Fall weather.

With **DARAKOTE**, you can coat cold, wet aggregates with cut-backs and road oils... and your patches stay put. **DARAKOTE** actually displaces water, permanently binds asphalt to the aggregate, prevents stripping even during heavy Fall rains.

DARAKOTE is more effective at all working temperatures. It maintains its strength, can't cook out or deteriorate in processing.

For asphalt cements, cut-back asphalts, road oils, road tars... **DARAKOTE** is a more efficient anti-stripping additive.

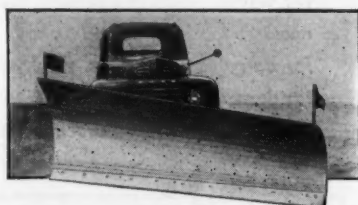


ANOTHER **DARAKOTE** JOB
Re-surfacing section of U. S. Highway
#1 at Attleboro, Mass.

**Dewey and Almy
Chemical Company**

Cambridge 40, Mass. Chicago 38
San Leandro, Calif. Montreal 32

GET BETTER RESULTS WITH GLEDHILL PLOWS



The well known, efficient one way plow—fits all trucks—easily attached—fold back hoist—automatic blade trip—sturdy, well balanced construction.

Gledhill's V-Plow — Wide wing span—heavy duty construction — interchangeable — direct lift — reasonably priced.

Get complete specifications from any Gledhill distributor or, write the factory.

THE GLEDHILL ROAD MACHINERY CO.
GALION, OHIO

Get **MORE JACKING POWER LONGER JACK LIFE**

A User Says:
"47,000 lifting cycles in 18 months operation under 340° temperature"

Simplex HYDRAULIC JACKS

Dependable performance, day after day on difficult jobs, produces reports like these from Simplex Hydraulic Jack users. Engineered for faster, safer jacking, with no maintenance cost, every Simplex Hydraulic has these superior features:

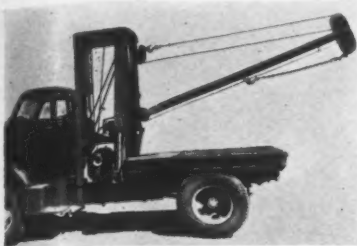
LEAKPROOF, WEARPROOF, high pressure packing seals of Neoprene.
SPRING CONTROLLED, NON-STICKING, Ball Valves for trouble-free operation.
HORIZONTAL or VERTICAL OPERATION with double lever sockets to speed work.

SMOOTH ACTING RAM of SAE X1112 steel, machined and ground to minimum tolerance.

Put a Simplex Hydraulic to work on your tough jacking jobs to save time and manpower. Available in eight models with capacities from 3 to 100 tons — safety-tested to 50% over rated capacity.

SEND TODAY FOR BULLETIN: HYDRAULIC 49

Simplex JACKS
TEMPLETON, KENLY & CO.
1002 S. Central Ave., Chicago, Ill.



No special tools are needed to install this hydraulic crane, the Hydra-Lift, on any type of truck frame. It requires only 35 inches of space behind the cab.

New Hydraulic Crane For Any Type Truck

A new hydraulic crane, the Hydra-Lift, designed for installation on any type of truck and with any make of winch, has been announced by the Pitman Mfg. Co., 300 W. 79th Terrace, Kansas City 2, Mo. The company points out that the driver of this mobile unit can control all swinging and lifting motions from his cab with complete visibility.

Hydra-Lift has a capacity varying from 6,000 pounds with the boom at 11 feet to 2,500 pounds with the boom at 20 feet. It locks automatically as it is raised so that it cannot slip. The hydraulic system for the crane has an operating pressure of 1,250 psi which, the company says, can be run off the fan belt or power takeoff. Outriggers, adjustable in height, allow for uneven terrain and offer truck support when lifting from the sides.

The Hydra-Lift has a sturdy channel A-frame. Steel castings are used throughout. The unit features a full 180-degree swing and a 100-degree lift. The boom is made of seamless steel tubing which can be telescoped from 11 to 16 or 20 feet. The company points out that no special tools are necessary for installation and that the unit requires only 35 inches of space behind the cab.

Further information on the new Hydra-Lift may be secured from the company. Or use the Request Card at page 16. Circle No. 69.

Trenching Unit Described

A new catalog describing recent improvements made on the Model 221 Trenchliner has been offered by Parsons Co., Newton, Iowa. The 12-page illustrated bulletin shows in detail some

of the exclusive Trenchliner features designed for high production speeds and versatile operation.

The Model 221 will dig 8½ feet deep, 16 to 36 inches wide. Features explained in the new catalog are the arch-type frame, travel clearance and digging balance, offset boom that shifts by power for trenching within 1½ inches of crawler tread clearance on either side, arc-type discharge conveyor that shifts through the entire machine for positive controlled discharge. Complete Spex and on-the-job photos are provided.

This literature may be obtained from the company, or by using the Request Card which is bound in at page 16. Circle No. 42.

N. Y. C. Tests Rubber On West Side Highway

In cooperation with the Natural Rubber Bureau, Washington, D. C., and with the help of the Bureau's Rubber Road consultant, Harry K. Fisher, New York City has placed experimental paving on five sections of the West Side Highway near 12th Street. One stretch, the longest, has a mix of asphalt and natural-rubber powder, three stretches have varying types of synthetic and processed rubber, and one control stretch uses regular asphalt. The entire project involved the covering of 1,500 square yards. At a later date 2,000 square yards will be added. All of the mixes were placed on the cobblestones with which the West Side Highway is paved at that point. The highway is one of the city's busiest roads. It is estimated that some 60,000 cars per day will roll over the new pavement section.

Officials on hand from the office of the Borough President of Manhattan included Charles Hand, Commissioner of Borough Works; Anthony Donargo, Chief Engineer; Harry Levy, Principal Assistant Engineer; and Warren W. Dyckman, Engineer in Charge of Maintenance.

Various tests to establish safety and longevity characteristics of all of the rubber pavements will be conducted by city engineers. The longevity tests will take some time, but as to safety—tests conducted in Virginia and Canada indicate that natural-rubber roads stop a car in less distance than do ordinary asphalt highways.

The type of natural rubber used in



Workmen rake into place New York City's first rubber paving, a mix of natural-rubber powder and asphalt. The natural rubber used here is the same type as that used in a Rotterdam, Holland, road which is said to have withstood traffic for over twelve years without requiring any repair.

this project is the same as that used in a road outside Rotterdam, Holland. Engineers were anxious to use this par-

ticular rubber because the Rotterdam road has been in operation, without repair, for over 12 years.

An OWEN BUCKET

...is a

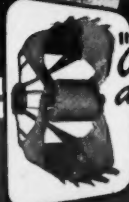
WORK HORSE on any BOOM

• In-built stamina through advanced, job-proved designs and the use of top-quality materials is characteristic of every bucket OWEN builds.

Owen Buckets withstand rugged usage, day in and day out for long periods of time with a minimum of service.

Get the complete picture and detailed story of the universally popular OWEN line of buckets and grapples by writing for the catalog.

Buckets AND Grapples



"A mouthful at every bite"

Write for Catalog

THE OWEN BUCKET CO.

4030 Breakwater Avenue - Cleveland, Ohio

Branches: New York - Philadelphia - Chicago - Berkeley, Calif.

A PAYLOAD... Every Cast!

Omaha Dragline Buckets dig in faster, fill quicker, and dump cleaner because 40 years experience of building buckets have made them the tops in the field. You'll find that Omaha Buckets are Profit Buckets. Write today for catalog giving complete description and specifications.

OMAHA DRAGLINE BUCKETS

DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

Military Sees Road Laid Fast Over Bog

Concrete Poured on Wire Mesh by Patented Method Supports 10-Ton Load Six Hours After Work Begins

A METHOD of building military roads and airstrips in far less time than is required by conventional methods was demonstrated to high military officers recently by Andrew Jackson Higgins, boatbuilder of New Orleans. Using his patented Thermo-Con construction material, Higgins laid a road which was firm enough to support a 10-ton load six hours after the first work began.

Thermo-Con is a cellular concrete which expands as much as 125 per cent after it has been poured. It has been used since the war for building a few experimental houses and for larger projects such as a 108-unit apartment house in Atlanta. Its chief attraction to military men is the possibility it suggests of laying down hard roads fast, fanning out from beachheads and traversing any kind of boggy terrain. It may shortly be tested at an Air Force field as strip material.

(Photos by Markstein & Associates, New Orleans, La.)



2. The first steps were to clear off growth and lay wire mesh right on the ground.



4. Then the Thermo-Con generator was wheeled up along a regular road through the bog.



6. Here is the road, complete down to the canal which borders the swamp, but still wet.



1. The spot chosen for Higgins' first Thermo-Con road was a swampy bog near his Michoud, La., plant. The bog is so deep a man has sunk to his waist in it.



3. The logs at the sides served as "forms" to keep the poured Thermo-Con in bounds.



5. The roadway takes shape as Thermo-Con is pumped through fire hose onto the mesh.



7. Higgins, left, and an assistant inspect. Notice the bog depth mark on that stick.

Do We Have Too Many Or Too Few Engineers?

The Prediction of an Oversupply of College Engineering Graduates Is Misleading: Shortage by '53

AS general magazines were prompt to tell us last June, there was an "oversupply" of engineers graduating from our colleges and universities. The prediction then was that the "oversupply" would last some time, and college engineering students were warned accordingly that they were entering an "overcrowded" field. But is there an oversupply and is the field overcrowded? Henry H. Armsby, Associate Chief for Engineering Education, Office of Education, had a word to say on the matter in the April, 1950, issue of *Higher Education*. The Korean situation now lends even greater significance to his analysis and conclusion.

How Many Engineers in Prospect?

An unprecedented number of veterans and nonveterans entered engineering colleges in 1946—93,000, in fact, or 8.6 per cent of the high school graduates of the preceding June, compared to a prewar average of about 3.2 per cent. Of these 93,000, according to Mr. Armsby, about 51,000 will graduate this year.

However, there has been a steady decline in engineering enrollments since that year. In 1947, about 64,000 college freshmen enrolled in engineering; in 1948, some 48,000; in 1949, some 42,000. In other words, only 3 per cent of the June, 1949, high-school graduates enrolled in engineering. That figure is back to and even below the prewar average of 3.2 per cent.

If survival ratios hold good (and the current war threat aside), institutions will confer about 35,000 engineering degrees in 1951, about 25,000 in 1952, and about 19,000 in 1953.

How Many Are Needed?

Now the Bureau of Labor Statistics has estimated that we will need 17,000 to 18,000 engineering graduates a year during the early part of this decade and about 22,000 by 1960. But this estimate is based on the number of actual engi-

neering jobs available. The Engineers' Joint Council for Professional Development finds that 35,000 graduates of 1949 have actually been placed in jobs which use their engineering training—a figure almost twice as large as the Bureau's estimate.

Mr. Armsby points out that the total number of engineers, as well as the ratio of engineers to total employment, has been steadily rising. Why? Industry and government need more and more engineering and research. Engineers themselves develop new processes and services which create needs for new kinds of engineers and technicians. Employers in general exhibit a growing tendency to recruit men with engineering training for positions which have not in the past been considered engineering jobs.

Shortage in 1953

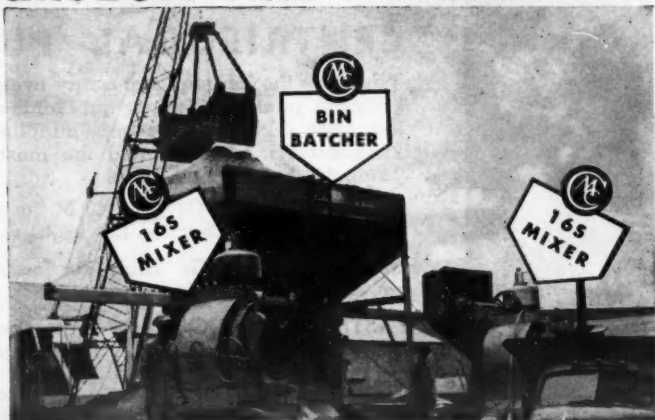
From these facts and estimates, Mr. Armsby argued in his April article that the small excess of engineering graduates over engineering jobs in (a peaceful) 1950 and 1951 would be absorbed in nonengineering work—especially administrative, application, and technical sales positions. And by 1953, he said, there would probably be fewer engineering graduates than actual engineering jobs to be filled. From 1954 to 1965, he pointed out, a serious shortage of engineers will develop, unless the ratio of freshmen engineers to high school graduates is increased.

Since Mr. Armsby wrote that article, the U. S. has shifted from peacetime to partial wartime mobilization. The shortage is therefore even more acute. In the list of critical occupations which the Secretary of Labor issued August 3, he included all the principal fields of engineering. But what is even more indicative is the fact that nearly all engineers who entered the job market upon graduation last June had been absorbed by industry before the Korean crisis.

A telephone survey of engineering colleges, Mr. Armsby tells us in a recent letter, indicated that about 62½ per cent of the June graduating class was placed by the middle of June. This suggests the probability that even without Korea the 1950 graduates would all have been placed by October or November.

Peacetime or wartime, we have too few engineers.

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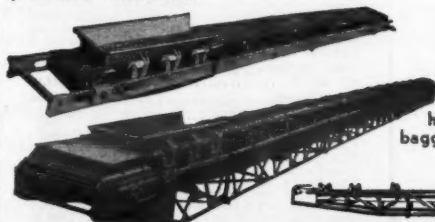


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Construction Tools

A new line of tools for building contractors, steel fabricators, and street and road contractors has been developed by Arrow Tools, Inc., 1900 S. Kostner Ave., Chicago 23, Ill. The new Structo line includes maul points, chisels, drift pins, sledges and hammers, wrenches and tongs, pneumatic rivet sets, and air-hammer tools. In addition to the demolition tools for jackhammer work the company also makes clay spades, asphalt cutters, and frost wedges.

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Further information may be secured from the company by requesting Bulletin CT-750. Or use the Request Card at page 16. Circle No. 86.



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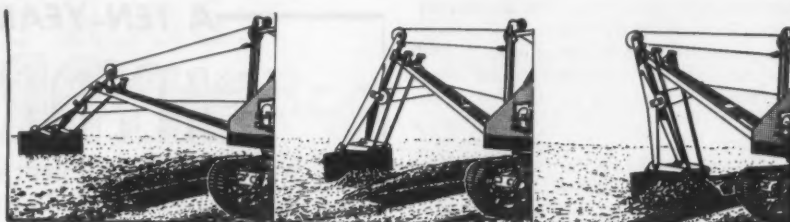
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The new backfill blade attachment developed by Schield Bantam employs simple blade-to-arm linkage which keeps the blade vertical to the ground at all times. It is used interchangeably with the truck-mounted Bantam trench hoe.

New Backfill Blade Mounts on Excavator

A new backfill blade attachment designed to speed covering and leveling of all types of excavation and trenching work has been announced by Schield Bantam Co., Waverly, Iowa.

Interchangeable with the ¾-yard truck-mounted Schield Bantam trench hoe, the new backfiller consists of a cable-operated steel blade mounted on a wishbone dip stick. Two tubular control arms hold the blade in a vertical position as it is pulled toward the machine. The manufacturer claims this "dozer action", plus fast mechanical controls, enables the Bantam blade to roll dirt loads into a trench fast and easily. The heavy-duty 24 x 60-inch blade has a ½-inch reversible cutting edge. The attachment has a maximum reach of 23 feet 6 inches in any direction, and can work to within 6 feet 6 inches of the center of machine rotation. It can be controlled vertically to within 1 inch of the ground surface, permitting smooth finished backfill, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 74.

New Tractor Meter Improves Operations

A five-in-one instrument called the Proof-Meter has been developed for use on the Ford tractor and is now standard equipment. It is marketed by Dearborn Motors, 15050 Woodward Ave., Detroit 3, Mich. It enables the tractor operator to determine at a glance the engine speed, tractor speed, power-take-off speed, belt-pulley speed, and hours of tractor operation.

The outer band of the Proof-Meter is the engine-speed indicator. This, says the company, enables the operator to

work at the proper engine speed for maximum job performance and fuel economy, rather than to rely on the sound of the engine. The tractor-speed indicator allows him to select the right speed and gear for soil-stabilizing work, mowing, spraying, etc. Efficient operation of accessory equipment is made possible by a power-takeoff speed indicator incorporated in the Proof-Meter. Belt-pulley speed, an essential factor in sawing wood, pumping water, and other tractor belt work, is determined by another band. A record of

tractor performance can be kept through use of the tractor hour meter which is a part of the Proof-Meter. This feature makes possible the timing of various tasks and also aids in proper servicing.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 115.

Crushing-Roll Bulletin

A new 40-page bulletin on crushing rolls has been prepared by Traylor Engineering & Mfg. Co., of Allentown, Pa. Exploded views of the three different types of Traylor rolls illustrate features which, the folder says, account for their operating economy. For example, the automatic lateral-adjustment mechanism, used to minimize annular corrugation and flanging of roll tires on type A and AA rolls, is fully described and illustrated.

This literature may be obtained from the company by requesting Bulletin 5637, or by using the Request Card at page 16. Circle No. 24.

Gorman-Rupp's Handle Low Water Crisis at Rye Lake



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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Contractor Loses Suit Based On "Account Stated" Theory

THE PROBLEM: In law, the term "account stated" implies that a creditor and debtor have agreed by word or act that a certain sum is due the creditor. The creditor can then sue for the amount agreed upon, basing the suit on that agreement, as distinguished from the agreement under which the indebtedness arose. For example, if the owner under a construction contract recognizes that the contractor, having completed his work, is entitled to a certain amount, the contractor can enforce payment without proving the items that make up the sum.

A contract called for a lump-sum price, partly payable on monthly estimates with the balance payable after completion on a certificate of the supervising architect. Could the contractor maintain a suit to collect the balance claimed by him on a theory that there was an "account stated", without proving that he had procured such a certificate or that the owner had waived the requirement for the certificate?

THE ANSWER: No. (Halvorson v. Blue Mountain Prune Growers Co-Op., 214 Pac. 2d 986, decided by the Oregon Supreme Court.)

The contractor submitted a statement of the amount claimed by him to the owner's architect. But the court decided that it was immaterial that the architect may have unreasonably delayed issuing a certificate, so far as concerned the contractor's right to sue on the theory of an "account stated". There was no evidence that the owner assented to the correctness of the contractor's statement. On the contrary, the owner's manager explicitly stated that no check would be issued until the architect's certificate was issued. (Of course, that would not have prevented a suit on the construction contract to collect the contract price, if the architect unreasonably delayed issuance of a certificate. But it did prevent suit on a theory that the owner had impliedly agreed to pay the sum claimed by the contractor.)

Incidentally, the Supreme Court discussed the following legal angles involved in disposing of the dispute between the parties:

Where a debtor retains, for more than a reasonable time and without objection, a statement of account rendered by the creditor, the retention may be regarded as an admission that he owes the balance shown by the statement. What is a reasonable time depends upon the facts of the particular case, including the nature of the parties' dealings. (An example may be found in the rendition to a contractor of a materialman's bill.)

But if a statement rendered to an owner by a contractor flatly contradicts the terms of the special contract between them, the owner's retention of the bill without objection will not amount to an implied admission of its correctness.

A supervising architect (or engineer) is not made sole judge as to the amount due the contractor by a contract provision for issuance of certificates as to performance, unless the provision makes the decision final, or unless the owner and the contractor have so treated the contract.

The Status of Cost-Plus

Contractors Is Decided

THE PROBLEM: A firm contracted with a real-estate corporation to install water and sewer systems on a tract of land on a cost-plus basis. Was the firm an independent contractor, in the sense that it, and not the real-estate corporation, was liable to an insurance company for premiums on workmen's compensation and public liability insurance policies covering performance of the work?

THE ANSWER: Yes. (Associated Indemnity

Corp. v. Walnut Hill Corp., 220 S. W. 2d 301, decided by the Texas Court of Civil Appeals, El Paso.)

The original contract was a conventional one, under which the work was to be done for a lump sum. The principal question in the case was whether the contracting firm became a mere employee of the real-estate corporation when the corporation exercised an option "to pay the actual cost of labor, material, and insurance in connection with this work, plus a fee of 2½ per cent of such cost in lieu of" the lump-sum figure.

The high spots of the court's opinion read: "A so-called 'cost-plus contract' is just another contract to be determined by its terms . . . its provisions will determine whether or not a contractor is the agent of the owner. . . .

"We take it, insofar as the contract is concerned, . . . there is no contention that the contract did not constitute" the contractor "an independent contractor. . . . There is nothing in the letter [in which the option to pay on a cost-plus basis was given the real-estate corporation] that altered that relationship or that changed the contractor's obligation . . . it merely reduced to a certainty the amount of compensation" the contractor "should receive . . . and made certain to the corporation that it would not pay more than the actual cost of labor, materials, and insurance plus the 2½ per cent fee to" the contractor. "It may be noted that the letter provided that the corporation on acceptance would 'pay the actual net cost of labor, materials, and insurance in connection with this work plus a fee of 2½ per cent of such cost,' and that it does not provide the corporation shall furnish the labor, material, and insurance and pay a fee of 2½ per cent of such cost to" the contractor, "nor is there any provision that the corporation

shall pay for such labor, materials and insurance."

The court cited a decision in another Texas case—Allen v. Republic Building Co., Tex. Civ. App., 84 S. W. 2d, 506—to the effect that the payment of a per cent of the costs of construction as compensation to the contractor is not inconsistent with the relation of independent contractor and owner, and the actual relationship must be determined from all of the terms of the contract.

Public Contract Bids—

Error in Totaling Items

THE PROBLEM: City sewer bidding specifications stated that unit-price bids would control totals. Petitioner was lowest bidder on such prices, mistakenly stating a total higher

than another bidder who was higher on unit prices and actual totals. The latter bidder left supposing that he had won the contract. The city, correcting the mistake, awarded the contract to petitioner. Was the award valid?

THE ANSWER: Yes. (Swanson v. Hildebrand, 210 Pac. 2d 95, decided by the California District Court of Appeal.)

The court noted that there was no proof that any of the rejected bids were submitted by the lowest responsible bidder; that there was no proof of fraud; and decided that the mere erroneous addition of the totals of unit-price bids did not defeat a valid award of the contract to petitioner. When the other bidder left the municipal commissioners' room he had no right to assume that he would get the contract merely because an

(Concluded on next page)

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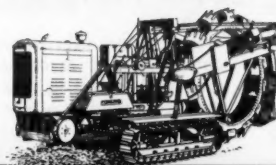


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Avoid Legal Pitfalls

(Continued from preceding page)

opening of the bids and the totals indicated that he was the lowest bidder, because the proposal and form of bids showed that the contract was to be awarded according to unit-price bids.

"Lowest and Best Bidder" Has an Elastic Meaning

THE PROBLEM: A Delaware statute required that city authorities let a waterworks construction contract to the "lowest and best" bidder. Plaintiffs were the lowest bidders, but after considering all the proposals submitted the water commissioners awarded the contract to a higher bidder. Plaintiffs, joined by a taxpayer, sued to enjoin carrying out of the contract and to require award of the job to plaintiffs. Was the suit properly dismissed for failure of the plaintiffs to claim that the award was induced by fraud or bad faith?

THE ANSWER: Yes. (Petters v. Mayor and Council of Wilmington, 72 Atl. 2d 626, decided by the Delaware Court of Chancery.) Here is the substance of the court's reasoning:

The commissioners' announcement on opening the bids that plaintiffs were the lowest bidders did not amount to an award of the contract to them.

The fact that plaintiffs were in every way qualified to do the work, plus the fact that they were the lowest bidders, did not necessarily entitle them to the contract.

Plaintiffs were the "lowest" bidders within the meaning of the statute, but the commissioners had considerable discretion to determine whether plaintiffs were the "best" bidders, so long as the commissioners acted in good faith.

The Delaware court noted that in New Jersey the courts have adopted a rule that, under a statute requiring an award to the "lowest responsible bidder", one cannot be made to a higher bidder without a formal hearing on notice to the lowest bidder and proof that he is not a responsible bidder. But the Delaware court said that, "despite the wholesomeness" of that rule, it does not conform to the view taken by most courts, that statutes like that in Delaware give an awarding body broad discretion to determine who is the lowest and best, or lowest responsible, bidder, without any formal hearing. The prevailing view, says the Delaware court, is that courts will not disturb the awarding body's determination unless it be shown that the "body has been guilty of fraud or bad faith, or unless it has failed to exercise its discretion, or in exercising it, has given substantial weight to factors which were not legally proper matters for its consideration." But the presiding judge said that it seemed clear to him that "an awarding body assumes a grave responsibility when it rejects the lowest bid in the absence of weighty relevant reasons for so doing—otherwise the protection afforded the taxpayers by the statute becomes a mockery."

Taxpayer's Right to Sue To Enjoin Improvement

THE PROBLEM: The Maryland Roads Commission chose to construct a bridge across Chesapeake Bay rather than a tunnel under it; estimates of engineers as to the cost of each type of improvement indicated that the bridge would cost considerably less. After bids were received for bridge construction, a taxpayer sued to enjoin award of a contract until bids should be received for tunnel construction. He asserted that the bridge bids indicated that the actual cost would equal or exceed the cost of a tunnel, and that the Commission had been misled as to the cost of operating a tunnel. Was the taxpayer entitled to the injunction sought?

THE ANSWER: No. (Masson v. Reindollar, 69 Atl. 2d 482, decided by the Maryland Court of Appeals.)

The court fully recognized that a taxpayer has a right to sue to restrain expenditure of public funds for an improvement that a public body is not legally empowered to make, or where fraud or corruption is involved. But the court said that the evidence disclosed no fraud or corruption; it showed that the Commission acted in good faith, within the discretion granted it by the statutes, and chose bridge construction after considering the report of reputable consulting engineers and recommendations of the Governor and State Highway Advisory Council.

Bumps Break Truck Frame; Policy Covers, Court Says

THE PROBLEM: Did the comprehensive and collision coverage of a policy insuring a dump truck cover breakage of the frame which resulted from driving the truck, heavily loaded, over bumpy places in a driveway leading from a gravel pit?

THE ANSWER: Yes. (Terrien v. Pawtucket Mutual Fire Insurance Co., 71 Atl. 2d 742, decided by the New Hampshire Supreme Court.)

The court decided that the somewhat vague and complicated provisions of the policy should be read as insured might reasonably understand them. The policy did not cover breakage due solely to ordinary wear and tear. But the court said the evidence showed that the direct cause of the break was the encountering of sharp bumps in the road, even if the frame had been previously broken and repaired. And it was decided that the policy was not so worded as to let the insurance company out of liability, even if the truck was negligently driven; the negligence was not so great as to amount to deliberate disregard of the probability of breakage.

Contractor Not Liable for Crap-Game Outcome

THE PROBLEM: Employees of a road contractor were on the company's premises near the main office awaiting assignment to work. They engaged in a crap game as they had frequently done with knowledge of the company, but no representative of the company participated. Two of the employees made a

side bet and then got into a row over it. One fatally injured the other by hitting him on the head with a plank.

Was the deceased worker's widow entitled to an award under the Texas Workmen's Compensation Act, on a theory that the death occurred in the course of his employment?

THE ANSWER: No. (American General Insurance Co. v. Williams, 227 S. W. 2d 788,

decided by the Texas Supreme Court.)

The court said: "Had the employer... originated the practice of shooting dice on its premises or adopted it as any part of its work plan, or made it a part of either the work or recreation of its employees to serve its purpose in any way, a different question would have been presented which we do not find it necessary to decide under the present facts."

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2†	0.167	0.250	0.05	0.785
3	0.376	0.375	0.11	1.178	0.262	0.015	0.143
4	0.668	0.500	0.20	1.571	0.350	0.020	0.191
5	1.043	0.625	0.31	1.963	0.437	0.028	0.239
6	1.502	0.750	0.44	2.356	0.526	0.038	0.286
7	2.044	0.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9†	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10†	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11†	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*Bar numbers are based on the number of 1/4 inches in the nominal diameter of the section.

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‡Bars numbered 9-10-11 correspond to former 1" sq., 1 1/4" sq., and 1 3/4" sq. sizes, and are equivalent to those former standard bar sizes in weights and nominal cross-sectional areas.

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Japan's 5-Year Plan Will Overhaul Roads

\$400,000,000 Program Designed to Modernize System Inherited Largely From Feudal Lords

The Japanese government, at the direction of the Allied Occupation Forces, has embarked on a 5-year \$400,000,000 road-building program. In its initial phases this long-range program will concentrate on the proper grading, drainage, and realignment of national highways. Technical assistance, more highway funds, and, to a lesser degree, additional imports of petroleum products and road equipment are needed for the successful completion of the program.

Highway History

The Japanese highway system, constructed over a period of 2,000 years, is largely a maze of winding dirt roads, many of them able to accommodate only man or animal-powered vehicles. Before 1868 the system was built in sections, one in each of the areas ruled by a feudal lord. Some of these lords built feeder roads from points of production to consumer markets, and developed road systems for their own regions, but they were careful to leave undeveloped areas for the defense of their borders. The systems were not connected.

When Tokyo became the center of political and social life, making it necessary for the lords to travel to the capital, some of the feudal areas were connected by through highways. During the Meiji era, around 1868, the first overall administration of roads was attempted. The Emperor delegated the responsibility to the Ministry of Civil Affairs, Engineering, and Finance. But by 1874 construction was once again in the hands of the feudal lords.

Toward the end of the century, contact with Occidental nations, and an increase in wheel traffic, made apparent the necessity of an overall road plan. A committee was appointed but it was fifteen years before the plan was ready. It became a law in 1920 and is still in effect.

As a part of its preparation for the second world war, Japan expanded her highway network in spokes radiating from each central army, navy, and air-force installation. Intermediate areas were neglected. During the present occupation the system has been expanded by the U. S. Army Engineers, who feel that funds spent on road repairs in Japan are compensated for by reduced wear on vehicles.

The System Now

Although Japan's highways are carrying more than the combined load of the two other major media of transportation, rail and water, the nation's number one highway on the busy east coast of the main island is only partly paved, and in Tokyo, where each ward is responsible for its roads, paved stretches alternate with narrow dirt roads.

Japan now has 518,000 miles of dirt and gravel roads and 7,200 miles of roads paved with asphalt or concrete.



This is one of Japan's through-wood truss bridges; \$60,000,000 is expected to be spent on bridge erection and rehabilitation during that country's five-year highway program.

Of the national highways, 5,700 miles are gravel and 1,000 are paved.

The country's primary highways can be compared to class C highways in the

United States. Most of these roads will not be paved at the completion of the program, but they will have been improved by grading and drainage.

The country's few concrete highways have usually been constructed to specifications of 10 meters in width and 6 to 8 inches in depth, and laid in bays of from 15 to 30 feet. Most of them have tar-filled expansion joints in the center and across the highway at 30-foot intervals. The paved sections of most hard-surfaced highways are composed of various combinations of asphalt and tar. Asphalt roads vary in width from 4.5 to 15 meters, with base courses of stone, gravel, concrete, or asphalt. Tar is often used for surfacing. Many of these roads were built "by basket", that is by hand laborers who toted the surfacing materials.

As part of a plan to give the Japanese technical assistance, the Occupation Army's Engineers Section has run classes during the last two years to instruct Japanese engineers in such basic matters as mixing and placing asphalt. The Army also has a program of training Japanese operators of steam shovels, graders, scrapers, heavy trucks, and

(Concluded on next page, Col. 2)

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Our monkey ancestors never had it so soft. Meet the new Industrial Monkey, a hydraulically operated metal boom with a self-leveling cage which lifts workers a height of 40 feet.

Truck-Mounted Boom Reaches Treetops

A new machine designed to reach hard-to-get-at heights has been developed by Capital Industries, Inc., Spalding Bldg., Portland 4, Oreg. Named the Industrial Monkey, the new unit consists of an extendable steel boom mounted on any 1½-ton or larger truck. On the end of the boom is a rail-protected automatically self-leveling work platform insulated to protect against 8,000 volts. The 16-foot boom extends to 26 feet and is mounted on the truck at a point approximately 6½ feet above the ground. The additional height of the worker enables him to work safely and at heights up to 40 feet. The hydraulic boom is controlled by the worker on the platform by an arrangement of foot buttons. It may also be operated from the truck cab. Power is obtained from the power takeoff of the truck transmission.

Preliminary tests of the unit indicate savings of 40 per cent in tree-trimming operations, it is reported. Noteworthy feature in tree trimming is the fact that the boom can be thrust straight up so that the worker can get at ordinarily inaccessible places. Another is the air line which makes it possible to use power tools from the platform without the awkwardness of hauling hose.

The boom is rated to carry a 200-pound man at any position with a 4 to 1 safety factor. Other specifications of the machine are as follows: weight, 2,500

pounds; road clearance in traveling position, 10½ feet; swing, 270-degree arc around turntable.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 101.

Japan's 5-Year Plan Will Overhaul Roads

(Continued from preceding page)

other road construction and maintenance equipment.

The Program

The 5-year program includes the construction of 16,600 miles of new roads, the rehabilitation of 262,000 miles of existing roads, 142 new steel or concrete bridges, 780 new semipermanent bridges, and the rehabilitation and improvement of 29,500 existing bridges. Ninety-five per cent of the roads will be gravel, which is thought sufficient for the relatively light vehicular traffic. The program is expected to require 291,500,000 man-days of work.

First priority is given to roads serving areas which now have no highway or rail transportation connecting them with the rest of Japan. Second priority goes to improving existing highways which have heavy traffic. And third priority, aimed at facilitating inter-community transportation, is being given to improving feeder highways which parallel existing railroads.

Valve-Facing Tool For the Repair Shop

A new valve-facing machine is announced by Cedar Rapids Engineering Co., Cedar Rapids, Iowa, manufacturer of the Kwik-Way line of engine-reconditioning equipment. The Model CV has a wet-grinding feature built in, with coolant pump integral with the machine base. The coolant pump is a special centrifugal type designed to prevent coolant from reaching pump bearings. The lever-operated quick-opening 6-ball chuck which takes Ford as well as straight-stem valves is incorporated into the Model CV for accurate centering, Cedar Rapids says.

The machine has a chucking capacity of ¼ to ⅝ inch and will grind all standard valve angles including 15-degree without special attachments. An automatic clutch starts and stops coolant

flow and chuck rotation. Simplified construction permits easy access to parts for servicing, according to the manufacturer. All drives are through V-belts adjustable for proper belt tension. Use of chrome plating where practical minimizes rust and corrosion of exposed metal surfaces.

The Kwik-Way Model CV valve-facing machine is available as a complete valve shop with railway service cabinet, valve-seat grinder, and insert tools, or as a separate bench unit.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 29.



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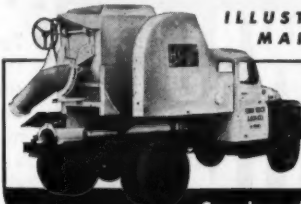
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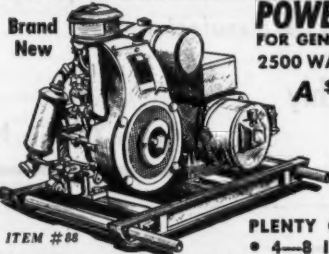


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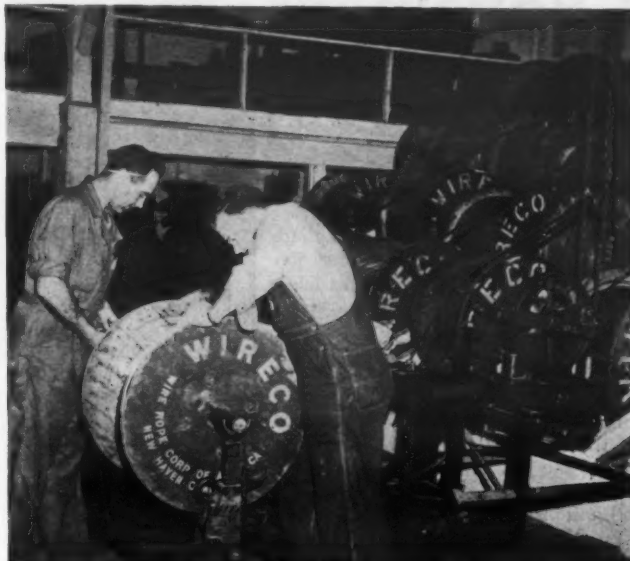
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10:58 a.m. No sooner is a customer's order for wire rope received by Dallas distributor Conley (below) than his men wheel out the machine which winds, measures, and cuts the cable.



11:00 a.m. This is a sizable order from the early-morning customer—1,300 feet of $\frac{5}{8}$ -inch 6 x 19 Lang-lay rope. So the men fasten the cable onto an empty reel rather than the spool used for smaller orders.



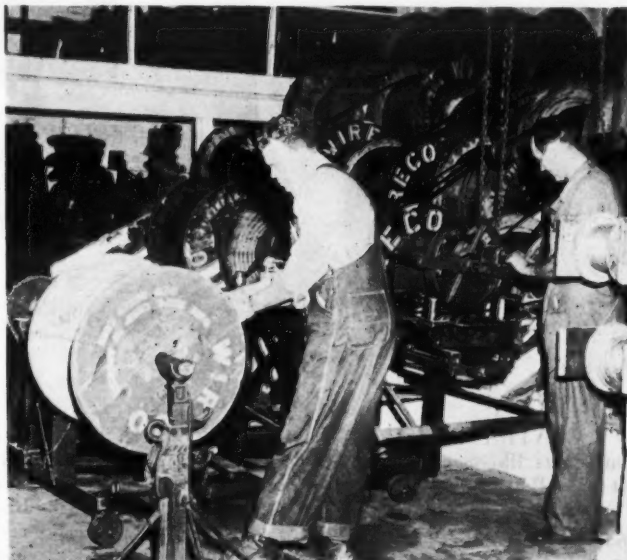
For shorter-length orders of any of the 50 kinds of cable sold by Conley-Lott-Nichols, this winding spool is used instead of a reel.



Rope Trick A la Conley

By RAYMOND P. DAY,
Western Editor

(C. & E. M. Photos)



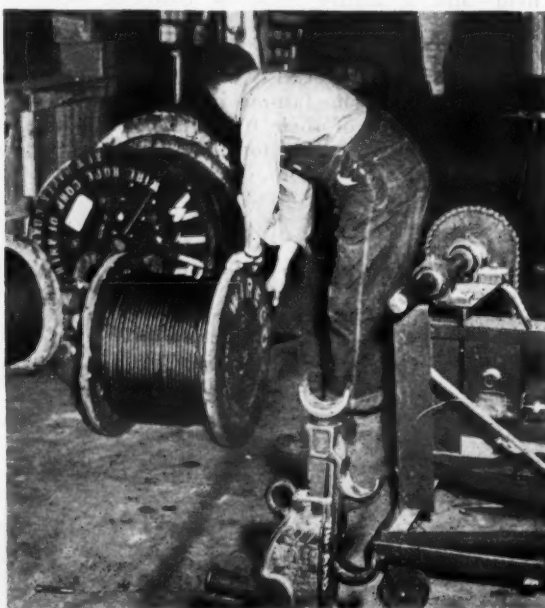
11:01 a.m. Winding begins. The man at the right is checking a Productimeter dial which will tell him when the 1,300-foot order is wound. The measuring machine has a Deming pump motor with gear-reduction box for spooling.



Let's take a look at the even spooling job the customer gets. The chain above is from a Cyclone hoist which moves full spools onto the rack.



11:07 a.m. Delivery complete. A Pelwal Hydrashear cutter snips off the cable as the man at the left checks the measuring meter. Lengths of 3,000 feet can be handled just as easily.



11:10 a.m. Twelve minutes after the order was written up in the front office by Conley, it is on its way to the loading platform. So much for order No. 1 of the day for Conley-Lott-Nichols Co.



For small-size wire rope, this Morse-Starrett hand cutter is sometimes used to snip off an order instead of the Pelwal Hydrashear.

Sand and Asphalt Mixed for Pavement

Road-Mix Job in Florida Employs Local Aggregate On Secondary Road; Laid On Stabilized Base

A PAVED highway, State Route 390, has been constructed in Bay County, northwest Florida, near Panama City. This new 5-mile job connects St. Andrew and Lynn Haven, replacing an old county dirt road. The new route, however, does not follow the old; the alignment is on new location for practically its entire length. Located in District 3 of the Florida State Road Department, the project was awarded by the State to Doyle Pope, a contractor from Quincy, Fla., on his low bid of \$121,533. Grading started last October, and continued through a winter favorable to construction. The road was scheduled for completion last June. As in almost all of Florida, this section along the Gulf Coast has a low and flat terrain composed of a sandy soil having a low bearing value. Generally the roadbed consists of shallow fills crossing the flat lowlands. After the right-of-way had been cleared and grubbed by dozers, ditches were dug to take care of the drainage. Culverts, both box-type and concrete pipe, were installed. Two draglines handled the ditch work—a Link-Belt and a Lorain with 1-yard and ½-yard Hendrix buckets respectively. The road design for this Federal-Aid secondary-type construction consists of a sand-bituminous road-mix pavement 6 inches thick and 18 feet wide, crowned at the center with a pitch of 3/16 inch to the foot. Five-foot shoulders slope at the rate of ¼ inch to the foot. Slopes on the embankment fills over this flat country are 4 to 1.

Sand-Clay Stabilized Base

Wherever the sandy subgrade did not have a minimum bearing value of 40 pounds to the square inch, it was stabilized with clay to bring it up to the required strength. Under the pavement the stabilized base has a depth of 12 inches, while the shoulders are stabilized 6 inches in depth. About 30 per cent of the entire job required stabilization of the subgrade. Actually, in the area of the pavement the sand subgrade was stabilized to a depth of 18 inches below finished grade, since the upper 6 inches was required to form the sand-bituminous road-mix pavement. The base course was made 20 feet wide so as to extend 1 foot beyond the pavement on each side.

Roadway grading was done mainly with dozers and tractor-scraper units. On hauls up to 2,000 feet, three Caterpillar D7 tractors, pulling LeTourneau Carryalls averaging 9 yards, were employed. For hauls up to 4,000 feet, the contractor used three Caterpillar DW10 rubber-tired tractors pulling Caterpillar scrapers carrying 12-yard loads. Necessary borrow for roadway embankments came from three pits about a ¼-mile average haul from the job. This material was mainly sand.

A longer haul of 6 miles was necessary to get the clay used in the stabilization. Chevrolet dump trucks loaded by a ½-cubic-yard Lorain dragline transported the clay material, which was spread over the roadway to a depth of 3 or 4 inches. It was then mixed thoroughly into the sand by motor graders and harrows. Two Caterpillar No. 12 graders were pulled through the fine sand by D7 tractors in the mixing operations. The tractors also pulled the harrows in a follow-up step. The materials were moist enough so that no water had to be added during the preparation of the base. Compaction was obtained with

a Tampo sheepsfoot roller pulled by a D4 tractor, and the final shaping of the base was done by the motor graders.

Road-Mix

For the sand-bituminous road-mix pavement, the material on top of the roadbed provided the aggregate for mixing with EA-4 asphalt emulsion. Before emulsification the asphalt has a penetration of 100-200 at 77 degrees F. It was supplied by the American Bitumuls Co., and shipped by barge from Baton Rouge, La., over the Intracoastal Waterway to Panama City. There it was transferred at a dock-side oil terminal into three feeder trucks which hauled it out to the job. Two of the tank trucks held 3,000 gallons while the third held 4,000 gallons.

(Concluded on next page)

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C&E Monthly's good looks are more than skin-deep. For its pages are delivering more solid, geared-to-the-reader editorial material than any other monthly in its field—and a higher ratio of editorial content to advertising.

Here is a magazine that is more than a bench champion for "class." C&E Monthly is a field champion for performance. Our fast-moving, wide-ranging editors spend two-thirds of their time out covering the construction field from coast to coast. They flush not only the big, spectacular jobs, but also those that have

unique features, big headaches and knotty problems. C&E Monthly covers jobs where new techniques are born, where ingenuity grapples with a bundle of bad breaks and builds another monument to American resourcefulness. These stories spice the pages of C&E Monthly and make it required reading for contractors, highway engineers and distributors in the heavy construction industry.

Another type of game our editors flush that helps our readers is new equipment and material items. C&E Monthly consistently outscores its field in this department.

This leadership pays off in readership and produces inquiries and orders for advertisers. It helps explain why CONTRACTORS & ENGINEERS MONTHLY carries more advertisers, and more exclusive advertisers than any other monthly in the construction field.

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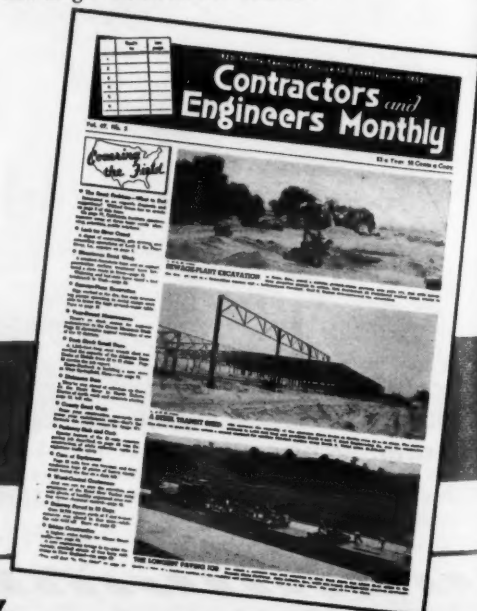
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the NEWSpaper of highway and heavy construction

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Aggregate and EA-4, at air temperature, were mixed in a Wood Roadmixer that was pulled along by a D8 tractor. The feeder tank, moving along at the side of the Roadmixer, was usually towed by a D4 tractor to prevent the heavily laden vehicle from slowing down in the soft ground. The asphalt emulsion was mixed at the rate of 1 gallon per inch per square yard, or as in the case of this 6-inch depth of pavement, 6 gallons per square yard. In order to get a 6-inch compacted depth of pavement, the mixer actually picked up from 8 to 9 inches of loose material. The machine moved along at the rate of 18 feet per minute.

To insure the full 18-foot pavement, the Roadmixer in practice mixed a 19-foot width. The usual procedure was to mix a 7½-foot lane along each side, and then come back and do the remaining 4-foot strip in the center. In this way some of the material was mixed more than the rest in the machine, but the mixing averaged out in the aeration that followed. A section about 4,000 feet long was done at a time. Instead of using the theoretical 6 gallons of bitumen per square yard, the mixer put out 5½ gallons, the extra ½ gallon being held in reserve. This excess asphalt emulsion was applied to lean-looking areas that appeared behind the mixer, with some being retained for use in seal-coating the pavement. The reserve was applied by an Etnyre 832-gallon distributor.

Aeration Process

Behind the road-mixing operations, the sand-bituminous windrows were at once aerated to get rid of the free moisture in both the sand aggregate and the asphalt emulsion. This aeration was done by the motor graders and a harrow pulled by the D4 tractor. The windrows of material were worked back and forth across the roadway until the moisture had decreased so that no cracking occurred in the shaping of the pavement. Compaction was achieved with the sheepfoot and a Bros pneumatic-tire roller, while the motor graders put the finishing touches to the mat.

A seal coat was then put on the newly laid pavement 30 days after the final finish. This consisted of an application of EA-4 at the rate of 0.2 gallon per square yard from the distributor. Enough sand was spread over the bitumen by hand to prevent picking up.



C. & E. M. Photo

A Wood Roadmixer travels State Route 390 in Florida picking up sand from the roadbed and mixing it with EA-4 asphalt emulsion.

The road was then ready for traffic.

Quantities and Personnel

The major items included:

Clearing and grubbing	76.7	acres
Excavation	75,437	cu. yds.
Sand-bituminous road-mix	66,920	sq. yds.
Bituminous material	400,000	gals.
Concrete for culverts	565	cu. yds.
Reinforcing steel	17,840	lbs.
Concrete pipe, 18 to 48-inch	3,208	lin. ft.

Contractor Doyle Pope employed an average force of 35 men on the project under Clin Myers, Superintendent.

For the Florida State Road Department, Corbin Cawthon was Project Engineer. G. L. Dickenson is District Engineer of District 3 with headquarters at Chipley, Fla. The Road Department is headed by Sam P. Turnbull, State Highway Engineer.

Respirator-Goggle

A respirator-goggle combination designed for worker protection against exposure to fine dusts, spray, or light impact of foreign particles has been developed by American Optical Co., Southbridge, Mass. The R2000 respirator protects against a variety of dusts or gases by means of specific cartridges or disk filters. The valve design provides complete air expulsion without sticking and does not allow moisture to collect or dust to enter, the manufacturer states. The No. 700 Goggle has a synthetic-rubber frame giving an airtight fit. Shatter-resistant replaceable acetate lenses are provided.

Further information may be secured from the company by requesting Pamphlet S-1162. Or use the Request Card at page 16. Circle No. 73.

Engineers in Civil Defense

The participation of professional engineers in civil defense and manpower mobilization will be an important item on the agenda when the

National Society of Professional Engineers meets in Little Rock, Ark., November 3 and 4. The group will also discuss public relations, professional ethics, and the administration of registration laws.

JACKSON

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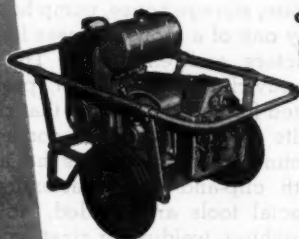
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TROUBLE-FREE SERVICE!

Ask any of the thousands of contractors who use Jackson Portable Power Plants and they'll tell you, practically to a man, that there is nothing that compares with these plants for downright reliability and the ruggedness that provides continuous service, day in and day out with no interruptions.

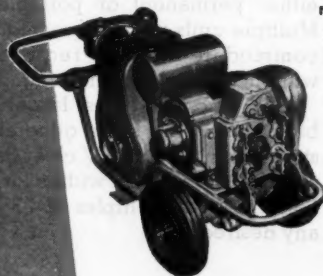
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Capacity: 1.25 KVA



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Capacity: 2.5 KVA



Model M-4
Capacity: 5 KVA

EQUIPPED WITH PERMANENT-MAGNET GENERATORS WHICH REQUIRE NO ADJUSTMENT OR MAINTENANCE — CONTAIN LESS THAN ONE-SIXTH OF THE PARTS IN A CONVENTIONAL GENERATOR.

ELECTRIC TAMPER & EQUIPMENT CO. Ludington, Mich.

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FORM RODS
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It's a Hoist... a Jack... a Puller

With stand, the Hoist-All is a powerful high-lift jack. Without stand, it's ready for all hoisting, pulling, load binding jobs. "Safety-load" handle protects against overload. Two rugged models—2000 and 4000 lb. capacity. For complete information write for bulletin C10HA.

COFFING HOIST COMPANY—Danville, Illinois

Quick-Lift Electric Hoists—Safety-Pul Ratchet Lever Hoists—Mighty-Midget Pullers—Spur-Geared Hoists—Differential Chain Hoists—Load Binders

Catalog on Vibrators And Electric Power Tool

A 12-page catalog featuring the Hi-lectric line of power tools for concrete and other construction work has been prepared by the Maginniss Power Tool Co., P. O. Box 28, Mansfield, Ohio. It covers the company's line of concrete vibrators, generators, saws, and grinders.

Hi-lectric tools are powered by gasoline engines or electric-motor-driven Hi-lectric generators of various sizes and types. An exclusive feature highlighted in the folder is the 120-volt system used to eliminate the possibility of injury to workmen. The reason for using 180-cycle current to power the tools, instead of the usual 60 cycle, is presented in the introduction, and expanded in a question and answer section. All equipment presented in the catalog is illustrated with closeups and on-the-job photographs. Complete descriptions and specifications are included.

This literature may be obtained from

the company by requesting Catalog No. 1-50, or by using the Request Card at page 16. Circle No. 104.

Use of Calcium Chloride For Unpaved Road Surfaces

A new 24-page booklet titled "The Why of Wyandotte Calcium Chloride for Roads" has been issued by the Wyandotte Chemicals Corp., Michigan Alkali Division, Wyandotte, Mich. The booklet was prepared primarily for

state and county highway commissioners and engineers, township supervisors, etc. Particular attention is paid, pictorially and editorially, to the practical problems of gravel and stone-road maintenance. The booklet discusses gravel loss, blading costs, spring breakup, and stabilized bases for future

surfacing. It also explains the circumstances under which calcium chloride will not work. Cost-conscious men will be interested in reading about the four alternate spot-treatment methods.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 11.

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ANY SERVICE

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to LAY OUT RIGHT ANGLES FOR FORMS, BLAST HOLES, GRIDS, EARTHWORK, HIGHWAYS.

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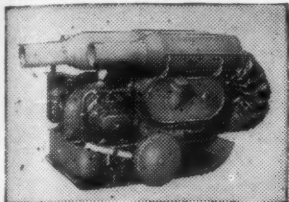
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